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XV.—COLA.

(*Cola acuminata*, Schott & Endl.)

LABOGIE COLA.

A general account of the Cola nut has been already given in the *Kew Bulletin* for 1890, pp. 253-260. In an article by Count Zech on the Cola of West Africa (*Mitth. a. d. Deutsch Schutzgebieten* xiv., p. 12, 1901) reference is made to the "Laboshi" Cola of West Africa, which is stated by him to be more prized by the Cola experts and traders of the Soudan than the Ashanti Cola. The Count mentions especially nine localities as providing this superior Cola, viz., Laboshi, Fashi, Yakudi, Gbaki, Patchiko, Kimbokun, Bete, Bitagi and Koda.

In January, 1904, specimens reached Kew from Mr. W. R. Elliott, Forestry Officer, Northern Nigeria, of the Cola found by him growing in the Labogie district of the province of Nupe in N. Nigeria. The letter accompanying the botanical specimens states that "this particular variety of Kola nut is in great demand throughout the whole of Northern Africa, and it fetches locally almost double the price of the kind with four or five cotyledons." The letter continues:—"The Kola plantations at Labogie and other places in the district are situated in sheltered valleys at an elevation of from 450 to 550 feet above the sea. The soil is a deep, black, sandy loam, and is kept in a continuous state of moisture by the streams that are found in each valley. Very little care is taken of the trees, and they are found growing with the Oil Nut Palm (*Elaeis guineensis*). The rainfall of the district is probably between 40 and 50 inches, but not a drop of rain falls from December to April."

On examination, the specimens forwarded by Mr. Elliott were found to belong to the genuine *Cola acuminata*, Schott & Endl.

(not of K. Schum.). This species is identical with the Cola of Sierra Leone and Ashanti, although the seeds received from Labogie are rather below the average size of the Sierra Leone article.

The source of the "Laboshi," or Labogie Cola, was not previously known and its determination was only possible after a thorough revision, by Dr. O. Stapf, of the group of species to which *Cola acuminata* belongs.

SYNONYMY OF COLA ACUMINATA.

Some dubiety has arisen as to the authorship of the species *Cola acuminata*. The subjoined note, prepared by Dr. Stapf, which explains the circumstances that have led to the uncertainty, may be of use in preventing a recurrence of the confusion that has been a consequence of this dubiety.

"*Cola acuminata* was originally described as *Sterculia acuminata* by Palisot de Beauvois in Flora d'Oware et de Benin, I. (1805), p. 41, t. 24, from specimens collected in the old kingdom of Oware in Southern Nigeria. When in 1832, Schott and Endlicher established the genus *Cola* (Meletemata Botanica, p. 33), they transferred *Sterculia acuminata* to *Cola* as *C. acuminata*. This publication was evidently overlooked by R. Brown, who, in 1844, contributed a description of *Cola acuminata* to Bennett's Plantae Javanicae Rariores (p. 237). The contribution appeared there without an author's name and was therefore attributed to R. Brown by subsequent authors, as for instance in Flora of Tropical Africa, v. I., p. 220, Kew Bulletin for 1890, p. 253, and as recently as 1900 by K. Schumann in his Sterculiaceae Africanæ, p. 125. The correct reference, however, is given in the Index Kewensis.

"Another complication was introduced into the nomenclature of the group of species to which *Cola acuminata* belongs, by K. Schumann's assumption that the *Sterculia* of Palisot de Beauvois was not the source of the so-called 'true Cola' of Sierra Leone, which he described accordingly as a new species under the name of *Cola vera* (in Notizblatt des Botanischen Gartens u. Museums zu Berlin, III. (1900), pp. 10-18).

"Palisot de Beauvois's figures, particularly that of the embryo which shows two large cotyledons, leave, however, no doubt that he meant what is now known as 'true Cola,' so that *Cola vera*, K. Schum. has to be considered as a synonym of *Cola acuminata*, Schott & Endl."

THE COLA INDUSTRY OF THE GOLD COAST.

Dr. Gruner, District Commissioner, Togoland, who visited the Gold Coast in August, 1903, on behalf of the German Colonial Agricultural Committee, for the purpose of obtaining information regarding the Cocoa and Cola industries in that Colony, published an interesting report on his visit in *Der Tropenpflanzer*, August, September, October, 1904. A précis of this report drawn up by

Mr. W. H. Johnson, F.L.S., Director of Agriculture, Gold Coast, has just been issued by the Government of the Gold Coast Colony. The note dealing with Cola is as follows :—

“The cola tree is very seldom planted, and the tending of those trees produced by natural agency is limited to the clearing away of bush and weeds; but every such tree has an owner, who claims this right in virtue of having effected the first clearing.

“Cola trees raised from seed commence to fruit when six or seven years old; produce is small at this period, but increases yearly until the tree is mature, when it will yield from 40 to 50 fruits.

“Two crops are produced annually, in December and April, of which the former is the principal. Fruits which fall off the trees are not collected, as they spoil rapidly; those plucked from the trees are stored in the shade, as the hot sun turns them black. When the nuts are freshly gathered some difficulty is experienced in skinning them, but if they are stored for a short time, the skin can be readily removed with the fingers. If the nuts harvested exceed the demand, the surplus is skinned and packed with the leaves of a particular plant (*Thaumatococcus Danielli*, Benth.) in broad baskets made of palm leaves, and stored.

“The Hausas, who are the principal consumers, convey salt to the cola districts and barter it for cola, 1 lb. of salt valued at 6*d.* being exchanged for 100 cola nuts. The price of cola, in the districts where it is produced, fluctuates between 3*d.* and 1*s.* per 100 nuts, but in Accra cost of transport raises it to 1*s.* 6*d.* per 100. Cola is principally exported by sea to Lagos; the value of the exports in 1900 and 1901 were £43,133 and £35,024 respectively, while the estimated annual value of the exports overland to the hinterland is £75,000.

“The principal cola markets in Akim are Insuaim, Essamang, Kwaben, Tumfa, and Kankan. In Kwaben or Tumfa it is possible to purchase from a single person 10 loads containing 2,000 nuts each. Previously the cola produced in Ashanti was only purchased by Hausas and transported by them northwards to the Hausa States, but the restoration of order in Ashanti and the completion of the railway to Kumasi has facilitated the transport of this crop to the coast.”

XVI.—FUNGI EXOTICI, IV.

The fungi described below are new species that have been recently received at Kew for identification. With the exception of one from the Tibetan Tableland all are species from South Eastern Asia. Those from Narcondam, a volcanic outlier of the Andaman group, some ninety miles to the east of Port Cornwallis in North Andaman, were collected by Mr. C. G. Rogers, F.L.S., of

the Indian Forest Department. Those from Northern India (Dehra Dun), from Southern India (Mysore), and from Assam, were collected by Dr. E. J. Butler, F.L.S., Cryptogamic Botanist for India. Those from Singapore and from Christmas Island were collected by Mr. H. N. Ridley, F.L.S., Director of the Botanic Garden, Singapore. The species from Tibet was collected by the Lama Ujyen Gyatsko, who a number of years ago made a collection for Sir George King, K.C.I.E., then Superintendent of the Royal Botanic Gardens, Calcutta, at the instance of Sir Alfred Croft, K.C.I.E., Director of Public Instruction, Bengal.

AGARICACEAE.

Lepiota microspora, Masee.

Pileus carnosulus, convexus dein expansus, late umbonatus, pallidus, primo villosus-fibrillosus postea squamulis rufescentibus adpressis vestitus, 1.5–2 cm. latus. *Lamellae* liberae, subconfertae, angustatae, albae. *Sporae* anguste cylindraneo-ovatae, hyalinae, $4.5-5 \times 2-2.5\mu$. *Stipes* brevis, 2 cm. longus, fistulosus, aequalis, basi bulbillosus, pallidus, infra annulum floccis albis cito deciduis primo vestitus.

ANDAMAN ISLANDS. Narcondam; on the ground, *Rogers*.

Distinguished at once from every known species by the very minute, subcylindrical spores; resembling in general appearance and stature *L. metulaespora*, Berk. & Broome.

Omphalia Rogersi, Masee.

Pileus membranaceus, tenax, convexo-umbilicatus, glaber, hygrophanus, striatus, ochraceus centro obscuriore, 1.5 cm. latus. *Lamellae* subdistantes, longe decurrentes, albidae. *Sporae* hyalinae, ellipsoideae, basi oblique apiculatae, $7-8 \times 5\mu$. *Stipes* fistulosus, glaber, aequalis, deorsum castaneus, sursum pallidior, 4–5 cm. longus, 1 mm. crassus, basi radicans, albo-lanosus.

ANDAMAN ISLANDS. Narcondam; on the ground, *Rogers*.

Allied to *O. camptophylla*, Berk., differing in the much more deeply decurrent gills, and the chestnut colour of the lower portion of the stem.

Panus ochraceus, Masee.

Pileus carnosus-lentus, tenuis, primo plano-dein expanso-depressus, subcylathiformis, testaceo-vel luridi-ochraceus, squamulis punctiformibus obsitus, aetate glabrescens, 4–6 cm. latus. *Lamellae* angustissimae, confertissimae, valde decurrentes, albae dein pallide ochraceae, acie integra. *Sporae* subcylindraceae, hyalinae, $7-8 \times 4-5\mu$. *Stipes* solidus, excentricus aut fere lateralis, squamulis ochraceis obtectus, 2–3 cm. longus, 4–6 mm. crassus.

NORTHERN INDIA. Dehra Dun; fasciculate on dead wood, *Butler*, n. 397.

Allied to *Panus torulosus*, Fr., differing in the narrower, more densely crowded gills and smaller spores.

Leptonia altissima, *Massee*.

Pileus tenuis, primo convexus dein plano-umbonatus, interdum depressus, cinereus, fibrillis obscurioribus virgatus, 4–7 cm. latus. *Lamellae* distantes, posticae sinuato-adnexae, uncino decurrentes, ex albo coerulescentes. *Sporae* subglobose, basi oblique apiculatae, $7-8 \times 6-7\mu$. *Stipes* altissimus, 9–14 cm. longus, sursum attenuatus, subfibrillosus, cinereus, cavus.

MALAYA. Singapore Botanic Garden; on the ground, *Ridley*, No. 4.

One of the largest and most beautiful of species included in the genus *Leptonia*. Allied to *L. chalybea*, Pers., and *L. euchroa*, Pers., in the colour of the gills and silky pileus.

Psilocybe tibetensis, *Massee*.

Pileus submembranaceus, campanulatus, dein expansus, glaber, nudus viscidulus, griseus centro brunneus vel rufescens, margine primo involutus et albo-pruinatus, 3–4 cm. latus. *Lamellae* confertae, ventricosae, postice rotundato-adnexae, ex purpureo fuscescentes. *Sporae* ovatae, brunneae, $13 \times 5-6\mu$. *Stipes* fistulosus, subaequalis, concolor, glabrescens, 2.5–3.5 cm. longus.

TIBET. Between Phari and Shigatse; growing on sandy ground, *King's collector*, No. 167.

Most closely allied to *P. cano-rubra*, Berk. & Broome, which differs in the striate margin of the pileus and much smaller spores.

POLYPORACEAE.

Polystictus villosus, *Massee*.

Pileus semiorbicularis, convexo-applanatus, sessilis, villosus, pallidus, zonis discoloribus variegatus, margine albicans, 3–5 cm. latus. *Tubuli* rufescenti-ochracei, curti; pori concolores, rotundati, minutissimi. *Sporae* obovatae, hyalinae, basi truncatae $7-8 \times 5\mu$.

NORTHERN INDIA. Dehra Dun. SOUTHERN INDIA. Mysore; on dead branches, *Butler*, Nos. 243 and 415.

The present species possesses many features in common with *Polystictus Feei*, Fr., differing in the villose pileus, shorter tubes and smaller pores. Flesh of pileus quite thin, whitish.

Poria chlorina, *Massee*.

Sporophorum latissime effusum, chlorinum vel flavo-viride, margine albidum, subfimbriatum, demum evanescens; subiculum tenue, submembranaceum. *Pori* majusculi, subangulati, ore primo integro demum lacerato. *Sporae* ovatae, hyalinae, $6 \times 3-3.5\mu$.

CHRISTMAS ISLAND. On dead wood, *Ridley*, No. 344.

The general habit is that of *P. vaporaria*, Fr., distinguished by the clear yellowish green colour, and somewhat angular, not sinuous pores.

Daedalea suberosa, Massee.

Pileus suberosus, dimidiatus, suborbicularis, sessilis, tenuis, margine acutus interdum lobatus, ochraceus, zonis concoloribus, glabriusculus, 4-6 cm. latus. *Pori* in sinulos subcontortos vel lamellosos labyrinthiformes abeuntes, acie obtusa. *Sporae* ovatae, hyalinae, 5-6 \times 3 μ .

SOUTHERN INDIA. Mysore; on wood, *Butler*, Nos. 399, 400.

Allied to *D. tenuis* Berk, from which it is distinguished by the almost glabrous pileus, clear ochraceous colour, and much thicker dissepiments with an obtuse edge.

THELEPHORACEAE.

Stereum papyraceum, Massee.

Pileus papyraceus, sessilis, convexo-planus, triqueter, postice angustatus, obscure brunneus, obsolete zonatus, setoso-hirtus, margine acuto patente. *Hymenium* nudum, laeve, glabrum, cinereo-lividum, purpurascens. *Sporae* ellipsoideae, hyalinae, basi apiculatae, 6-7 \times 4-5 μ .

ASSAM. Khasia Hills at Wajhain; on dead wood, *Butler*, No. 380.

A well marked species, readily distinguished by the dusky colour of every part; the hispid pileus, and more especially by the thin, papery texture. Allied to *S. pannosum*, Cke., a native of New Zealand; in the latter, however, the pileus is glabrous, and the texture thicker and firmer; the spores are also larger than in *S. papyraceum*.

Auricularia Butleri, Massee.

Pileus coriaceo-gelatinosus, tenuis, flaccidus, effusus, reflexus, sericeus, cinnamomeus, zonis concentricis discoloribus variegatis, margine lobato. *Hymenium* rugulosum, glabrum, nudum, e cinereo-nigro purpurascens. *Sporae* subcylindratae, curvulae, hyalinae, basi oblique apiculatae, 10-11 \times 5 μ .

NORTHERN INDIA. Dehra Dun; on dead wood, *Butler*, No. 255A.

A very distinct and beautiful species, sometimes imbricated and extending laterally for a considerable distance. Most nearly allied to *A. mesenterica*, Fr., which differs in the absence of a lobed margin, non-rugulose hymenium and very much larger reniform spores.

XVII.—AGRICULTURE AND THE EMPIRE.

Under this title the subjoined valuable article, from the pen of Sir W. T. Thiselton-Dyer, appeared in the issue of *Nature* for March 22, 1906 :—

"*Nature* for January 11 contains a short paper on a large "subject. Seeing that the cultivation of the soil, or Agriculture,

"is the fundamental condition of human existence with any approach to civilisation, large is a very moderate description.

"I take it that the object of the writer was to discuss the part that the Home Country should play in advancing agriculture in the Empire at large. That this is a matter which seems to me important enough to receive a little discussion. It is one with which I have been a good deal occupied during the past thirty years. I should like therefore to attempt to define the present position of the problem a little more precisely.

"May I begin with a very obvious remark: Agriculture is a sort of 'noun of multitude.' There is undoubtedly only one agricultural science based on physiological principles: there are many agricultural 'arts' based on the application of that science, whether empirical or otherwise, to widely different physical conditions. The agriculture of the Lothians differs widely from that of Bengal, and both differ from that possible on the Gold Coast. This will seem to many an absurdly trite remark. Nevertheless, experience shows that it represents a fact which has often been overlooked with loss and disappointment as the result.

"It may, I think, be confidently stated that arable cultivation has been brought in the British Isles to a pitch of perfection which is not surpassed anywhere in the world. It is, however, an 'intensive' and highly specialised agriculture. This is readily illustrated by the yield of wheat per acre. On land of prairie value where the nitrogen removed is balanced by that received from the atmosphere it has been shown at Rothamsted that the yield is roughly some ten bushels or less. This actually represents the state of things in the great wheat-growing countries from which we draw our supplies:—Argentina, Australia, India and Russia, and the United States with 13 bushels are not much better. The yield of the United Kingdom for the five years preceding 1904 was 31 bushels, and this was only surpassed by that of our antipodal colony New Zealand, 32.

"This is largely due to the scientific research in agriculture for which, I think, it may be fairly claimed this country has always been pre-eminent. I by no means think that it is exhausted. I remember Sir John Lawes saying to me that having devoted half a century to the study of the soil actually cultivated, he was still absolutely ignorant as to the subsoil and the part played by it. Our knowledge of the action of manures is mainly empirical and we have still to learn much of its physiological significance. Without this it cannot be said that we possess a rational theory of manuring. Farmers must have wasted enormous sums in the application of nitrogenous manures till Frankland showed that a considerable proportion passed off unused in the drain-water.

"I must confess that I am not clear that the arable agriculture of the United Kingdom is in a backward condition, that it does not compare favourably with that of other countries, or that it stands in urgent need of Government aid in regard to research. Its theoretical principles can be taught in our Universities and schools: its practice can only be learnt on the farm. While

"saying this I must also express my conviction that the agricultural wealth of this country might be increased in many ways. In my evidence before the recent Departmental Committee on Fruit Culture I expressed a strong opinion that the condition of that industry was in no way creditable to us.

"At the moment, where, so to speak, the shoe pinches is not above but below. There is no dearth of scientific knowledge in the country, but it floats on the surface and does not permeate. The scientific and even practical ignorance of the small cultivator is profound. The Board of Agriculture and Fisheries has tried to grapple with this by the wholesale distribution of carefully prepared leaflets. But such a method of disseminating knowledge is of almost heart-breaking difficulty. I have had prepared at Kew a series of diagrams illustrating the diseases of trees, suitable for schools. The *Daily Graphic* was good enough to say that :—'This publication is equal to the very best of those ever sent out by the United States Department of Agriculture.' Yet the sale has been disappointing and the Board of Agriculture and Fisheries does not see its way in consequence to proceed with the further and still more needed series dealing with the Diseases of Fruit Trees. The crying need, in my judgment, at the moment is the introduction of intelligent cultural instruction into rural elementary schools.

"If we turn to India we have to face a difficult problem. The revenue is dependent on the land, and this in turn has to support a constantly increasing population. It has been supposed that this might be met by the use of British methods. But how? Sir James Caird, who was sent out to study the problem on the spot, reported that if the produce of the land could be increased by one bushel per acre, all would be well. No doubt, but how is this intensive cultivation to be accomplished? Long cultivation has brought the land down to a condition of nitrogen-equilibrium. Dung is used as fuel and the cultivator is too poor to import artificial manures.

"In 1900 I attended a conference at the India Office on the qualifications of an Inspector-General of Agriculture. The report of the proceedings is printed in the *Bluebook of the Botanical Work Committee* (pp. 77-78). I stated then and the statement met with general assent :—'It would be the greatest mistake to substitute for Indian agricultural practices western methods, merely because they had succeeded in the west. . . . The problem in India was how best to graft the results of scientific agricultural knowledge on to the stock (the really valuable stock) of Indian agricultural practice and experience.'

"India has long had experimental farms in plenty. They have not been without their usefulness. But they have lacked permanence and a guiding principle. It now owes in great measure to the munificence of an American gentleman, an Agricultural Research Institute at Pusa. It is further, I believe, intended to establish a number of subordinate stations at a cost of £250,000. If these are to be staffed from home *forthwith* the result will be very much what the Transvaal Director of Agriculture points out. The Government of India should at once

“make up its mind what appointments it proposes ultimately to make and inform the Universities at home five years in advance. Students at the Universities cannot be expected to engage in agricultural or allied studies unless they see clearly what is to come of it at the end.

“Let me turn now to the problem presented by the West Indies and other of our tropical possessions. Sir Daniel Morris is quoted as saying in regard to the former:—‘Agricultural education is at the root of the successful development of these Colonies.’ This is perfectly true, only I rather doubt whether the writer of the article quite understood the reason. In temperate countries agriculture is a necessity of existence; in many tropical it is not. The wasteful production of a few ground provisions calls for the minimum of effort and is sufficient to sustain indolence. But with the introduction of orderly government a revenue becomes necessary. Sir Charles Bruce has laid it down that:—‘in the Crown Colonies generally . . . the only taxable fund is the wage fund supplied by the annual proceeds of the cultivation of the land’ (*Proc. Colonial Institute*, vol. xxxvi., p. 248). To induce the negro to engage in profitable cultivation instead of contenting himself with a bare modicum of ground provisions, provides a source of revenue, raises his standard of comfort, and makes for his moral progress. But he has to be taught by example how to do it and this is the agricultural education which Sir Daniel Morris had in his mind. It is widely different from anything of the kind in the country.

“In point of fact Tropical Agriculture has little relation to that of Temperate countries. Its methods are those of Horticulture: it is essentially extended gardening. For the supply of men for this purpose our agricultural colleges would be of little or no use. The problem has had to be met in a wholly different way. The machinery for the purpose is compendiously described in the following extract from the *Colonial Office List* (p. xx.):—‘Botanic Stations . . . are small and inexpensive gardens, devised in 1885, in order to afford practical instruction in the cultivation of tropical crops, and were intended to develop the agricultural resources at first of the smaller West Indian Islands, and subsequently (1887) of British possessions in Tropical Africa. Each is in charge of a Curator, who is a gardener trained at Kew.’ The sort of success that has attended the system may be illustrated by a single example. Cacao was introduced to the Gold Coast from Kew. In 1891 the export was valued at £4. In 1900 I was able to exhibit at the Paris Exhibition from the Botanic Station the first sample, to the best of my belief, grown on the African continent when it received a bronze medal. In 1904 the export had risen to a value of over £200,000. In effect Cacao is exchanged for imported goods; besides thus adding to the comfort of the cultivators, it enables them to pay the taxes necessary to maintain peaceful government.

“For work of this kind the Empire has to depend on Kew which is organised for the purpose as an advanced horticultural school. At the present moment some seventy Kew men are in official employment and carrying on the work I have described in our various tropical colonies and possessions.

"But besides native peasant cultures British capital and enterprise are also largely embarked in the tropical regions of the 'Empire in 'planting industries.' These meet with difficulties which the local Government can and does supply skilled aid to mitigate. Most of the West Indian Colonies have a 'Government Analyst.' Cambridge has secured the traditional right to train and supply these. Incidentally they are able to give important aid in dealing with agricultural problems. The value of the work done by Professor Harrison in British Guiana, and Professor d'Albuquerque in Barbadoes can hardly be over-estimated.

"Ceylon possesses an almost unique staff of trained experts of every kind at Peradeniya, and a similar organisation is in process of establishment in the Federated Malay States. The rubber industry of the Straits Settlements owes its success to the Director of Public Gardens at Singapore. Besides Pusa, India has experienced botanical experts, all University men, at Calcutta, Madras and Saharunpore.

"Our self-governing colonies know pretty well how to take care of themselves. All possess Agricultural Departments and produce Journals which will compare more than favourably with anything at home. In Canada the Central Experimental Farm at Ottawa is certainly not eclipsed by any institution in the United States. I may be pardoned a little vanity if I remark that when the Transvaal Government applied to Washington for an Agrostologist, it received a Kew man.

"To sum up:—What the Home country can supply to the Empire is:—(i.) cultural instructors such as are trained for the purpose at Kew, (ii.) men with a sound scientific training and a firm grasp of the principles underlying agricultural practice of whatever kind, and for these we must look to the Universities. Men who are merely familiar with British agricultural conditions will be mostly of little use unless they possess the flexibility of mind which will apply theory to new and unfamiliar conditions."

XVIII.—DIAGNOSES AFRICANAE, XVI.

811. *Polygala latipetala*, N. E. Brown [Polygalaceae]; affinis *P. tenuifoliae*, Link, sed floribus multo minoribus facile distinguitur.

Planta multicaulis. *Caules* 15–25 cm. longi, erecti, graciles, virides, minutissime puberuli. *Folia* alterna, 6–17 mm. longa, 1–1.5 mm. lata, linearia, acuta, glabra. *Racemi* terminales et pseudolaterales, 3–9 cm. longi. *Bracteae et bracteolae* 1 mm. longae, ovatae, subcutae, concavae, deciduae. *Pedicelli* 2.5–3 mm. longi, minutissime puberuli. *Sepala* 2 mm. longa, inferiora connata. *Alae* 4 mm. longae, 3 mm. latae, ellipticae, obtusae, virides, margine roseo-purpureo. *Petala* lateralia 4 mm. longa, 5 mm. lata,

latissime cuneato-obovata, apice truncato-rotundata, purpureo-caerulea, glabra. *Carina* 6.5 mm. longa, 2.5 mm. lata, obtusa cristata, purpureo-caerulea. *Capsula* 4.5 mm. longa, 3 mm. lata oblonga, apice breviter bifida, obtusa, glabra. *Semina* strophiolata dense albo-sericea.

RHODESIA. Mashonaland, between Umtali and Salisbury, *Hon. Mrs. Evelyn Cecil*, 45.

812. *Abutilon Cecili*, *N. E. Brown* [Malvaceae-Malveae]; affine *A. Rehmanni*, Baker f., sed carpellis apice rotundatis differt.

Frutex ramis velutinis et pubescentibus. *Folia* rotundato-cordata, obtuse acuminata, grosse crenato-dentata, supra viridia, pubescentia, subtus velutino-tomentosa cum pilis longioribus munita, 5-6.3 cm. longa, 5 cm. lata, petiolis 2.5-4 cm. longis. *Flores* axillares, subfasciculares. *Pedicelli* 2-3.5 cm. longi, breviter villosi-pubescentes et velutini. *Calyx* ad medium 5-lobus, velutino-tomentosus, lobis ovatis acutis. *Corolla* 2.5 cm. diam., alba, basi rubro-purpurea. *Columna staminea* rubro-purpurea, ad medium parce pubescens. *Carpella* apice obtuse rotundata, dense tomentosa.

RHODESIA. Manika District, on the Inyanga Mountains, 1800-2100 m., *E. Cecil*, 196.

813. *Hibiscus mutatus*, *N. E. Brown* [Malvaceae-Hibisceae]; affinis *H. Carsoni*, Baker, sed elatior ramosior et foliis elliptico-ovatis nec 3-nervatis differt.

Frutex ramosus, 1-1.3 m. altus, ramis pilis stellatis scabridis. *Folia* parva, breviter petiolata, 8-12 mm. longa, 6-12 mm. lata, elliptica vel elliptico-ovata, crenato-dentata, utrinque scabrida. *Stipulae* parvae, subulatae. *Pedicelli* 8-17 mm. longi, scabridi. *Bracteolae* 7, lineari-subulatae, 2-4 mm. longae. *Calyx* profunde 5-lobus, scabridus, lobis 4-6 mm. longis, 1-1.3 mm. latis, linearibus, subobtusis. *Corolla* primum alba, mox carnea vel rosea, petalis 2 cm. longis, suberectis, obovatis, extra sparse stellato-pubescentibus. *Styli* 5, e columna staminea longe exserti. *Capsula* globosa, 6-8 mm. diam., puberula.

RHODESIA. Matabeleland, on the Matoppo Mountains, *Hon. Mrs. Evelyn Cecil*, 108.

814. *Melhanian obtusa*, *N. E. Brown* [Sterculiaceae-Dombeyae]; affinis *M. acuminatae*, Mast., sed foliis obtusissimis obscure denticulatis differt.

Frutex ramis brunneo-tomentosis. *Folia* petiolata, 2-6 cm. longa, 1-2 cm. lata, oblonga vel sublanceolato-oblonga, subtruncata, basi rotundata, obscure denticulata, utrinque dense tomentosa, petiolis 6-8 mm. longis brunneo-tomentosis. *Stipulae* 5-9 mm. longae, subulatae. *Pedunculi* 2.5-4 cm. longi, biflori, brunneo-tomentosi. *Sepala* circa 10 mm. longa, 6 mm. lata, cordato-ovata, cuspidato-acuminata, dense tomentosa. *Petala* circa 12 mm. longa, obovata, lutea. *Staminodia* 8 mm. longa, 1 mm. lata, subspatulato-linearia, glabra, staminibus multo longiora. *Ovarium* dense albo-tomentosum.

RHODESIA. Matabeleland, near Buluwayo, *Hon. Mrs. Evelyn Cecil*, 94.

815. *Hermannia Gilfillani*, *N. E. Brown* [Sterculiaceae-Hermannieae]; affinis *H. linearifoliae*, Harv., sed stipulis longioribus et lobis calycis latioribus obtusioribus differt.

Frutex ramosus, lignosus. *Rami* minutissime stellato-puberuli. *Folia* fasciculata, 3-10 mm. longa, 0.5-1 mm. lata, linearia, sub-obtusa, canaliculata, rigidula, glabra. *Stipulae* 2.5-7 mm. longae, foliis similes. *Flores* pauci, terminales. *Pedunculi* 1-1.5 mm. longi, 1-2 flori, bibracteolati, minutissime tomentelli. *Bractee* 1-1.5 mm. longae, lineares, acutae. *Pedicelli* 1-1.5 mm. longi. *Calyx* latissime infundibularis, 5-lobus, minute stellato-puberulus; tubus 2.8 mm. longus, 4.5-5 mm. latus; lobi 2.5-3 mm. longi, 3 mm. lati, late deltoidei, acuti, patentes. *Petala* arcte convoluta, 8.5 mm. longa, 5 mm. lata, orbiculata, obtusissima, abrupte unguiculata, rubro-purpurea, glabra; unguis subconvolutus-tubulosus, apice utrinque fasciculo parvo pilorum minorum instructus. *Stamina* inclusa; filamenta 2.5-3 mm. longa, 1 mm. lata, oblonga, acuta, basi ad $\frac{1}{3}$ connata, pilis minutissimis stellatis paucis ciliata; antherae 2 mm. longae, lanceolatae. *Ovarium* acute pentagonum, sessile, tomentellum; stylus 3 mm. longus, basi puberulus.

CAPE COLONY. Middelburg Division, at Conway Farm, 1100 m., *Gilfillan in Herb. Galpin*, 5506.

816. *Zygophyllum Gilfillani*, *N. E. Brown* [Zygophyllaceae]; affinis *Z. incrustati*, E. Mey., sed espinosum, foliolis latioribus et capsulis orbicularibus.

Frutex ramosissimus, cortice cinereo. *Folia* opposita vel quaterna, glabra; petiolus 1-1.5 mm. longus; foliola 4-6 mm. longa, 2-4.5 mm. lata, oblique elliptico-oblonga, obtusissima, uninervia. *Pedicelli* 4-9 mm. longi, minutissime puberuli. *Sepala* 3.5 mm. longa, 2 mm. lata, oblonga, obtusissima. *Petala* 5-6 mm. longa, 3-3.7 mm. lata, elliptico-obovata, obtusa, lutea. *Stamina* petalis breviora. *Squamae* 2 mm. longae, oblongae vel elliptico-oblongae, breviter fimbriatae. *Fructus* 6-7 mm. longus, 7 mm. latus, ambitu orbiculatus, utrinque retusus, pentapterus, apice apiculatus, glaber.

CAPE COLONY. Middelburg Division, Conway Farm, 1100 m., *Gilfillan in Herb. Galpin*, 5512.

817. *Pelargonium reliquifolium*, *N. E. Brown* [Geraniaceae-Geranieae]; affine *P. sideoidei*, DC., sed minus floribus albis.

Fruticulus ramosus. *Rami* petiolorum basibus persistentibus undique dense obsiti. *Folia* ad ramorum apices confertissima; petiolus 1.2-5 cm. longus, gracilis, minutissime velutinus; lamina 9-17 mm. longa et lata, suborbiculata, obtusissima, basi cordata, subintegra, minute crenulata, utrinque minutissime velutina, subtus pallida; lobi basales late rotundati, contigui vel imbricati. *Inflorescentia* laxa et paucè ramosa. *Umbellae* 3-5-florae. *Bractee* 5-7, lineares vel oblongae, acutae, puberulae, 4-5 mm. longae,

1-1.5 mm. latæ. *Pedicelli* 1-3 cm. longi, puberuli. *Sepala* inaequalia, 4-5.5 mm. longa, 1-1.5 mm. lata, lineari-lanceolata, acuta, puberula, inferiora reflexa. *Petala* 5, leviter inaequalia, cuneato-obovata, obtusa, circa 1 cm. longa; superiora 3 mm. lata, alba, inferne rubro-venosa; inferiora 4-5 mm. lata, omnino alba. *Stamina* 7, omnia perfecta. *Carpella* pilosula.

CAPE COLONY. Middelburg Division, Rosmead Junction, 1200 m., *Sim in Herb. Galpin*, 5632.

818. *Oxalis densa*, N. E. Brown [Geraniaceae-Oxalideae]; species distinctissima, affinis *O. bifurcae*, Lodd., sed acaulescens.

Herba pusilla, acaulis, bulbosa? *Folia* dense conferta, trifoliolata; petioli 1-2 cm. longi, graciles, parce pilosi; foliola 4-5 mm. longa, ad medium biloba, basi cuneato-acuta, supra glabra, subtus laxe pilosa, ciliata; lobi 2-3 mm. longi, 0.7-1.5 mm. lati, lineari-oblongi, obtusi, divergentes. *Pedunculi* petiolis subaequales vel breviores, 10-17 mm. longi, prope basin articulati, prope apicem bibracteati, inferne glabri, apice breviter pilosi. *Bractee* 1.5 mm. longi, filiformes. *Sepala* 4 mm. longa, 1.5 mm. lata, lanceolata, obtusa, nigro-purpureo-lineata, exteriora dorso laxe pilosa vel ciliata, interiora glabra apice ciliata. *Corolla* 15-17 mm. longa, alba vel lutea?, nigro-purpureo-lineata, plus minusve pubescens. *Stamina* inaequalia, glabra, edentata.

CAPE COLONY. Calvinia Division, at Brand Vley, *Johannsen*, 9.

819. *Impatiens Cecili*, N. E. Brown [Geraniaceae-Balsamineae]; affinis *I. Mannii*, Hook. f., sed foliis acute serrulatis et calcare longiore facile distinguitur.

Caulis simplex, herbaceus, superne plus minusve pubescens. *Folia* petiolata, ovata vel elliptico-ovata, acuta, acute serrulata, utrinque glabra, laminis 3-4.5 cm. longis, 1.5-2 cm. latis, petiolis 6-15 mm. longis. *Flores* axillares, solitarii. *Pedicelli* 3-5 cm. longi, pubescentes vel fere glabri. *Sepala* 3, lateralia 4 mm. longa, 1.5 mm. lata, ovato-lanceolata, subulato-acuminata, inferius 1 cm. longum, subhemisphaericum, apiculatum, longe calcaratum, purpureo vittatum, calcare 2.5 cm. longo tenui procurvo. *Petala* 3, rosea, superius 6 mm. longum, suborbiculare, concavum, infra apicem emarginatum apiculatum, lateralia 17 mm. longa, circa 8 mm. lata, biloba, lobo basali oblique ovato acuto, lobo terminali oblique obovato obtuso.

RHODESIA. Manika District, by the side of a stream near Pangwe Falls, *E. Cecil*, 169.

820. *Indigofera Cecili*, N. E. Brown [Leguminosae-Galegeae]; affinis *I. eriocarpae*, E. Mey., sed floribus majoribus bracteisque longioribus differt.

Planta herbacea, 30-45 cm. alta, ubique foliolis supra glabris exceptis pilis basifixis tomentosa. *Caulis* 3 mm. crassus, striatus, foliosus. *Folia* 4-6.3 cm. longa, imparipinnata, foliolis 7-15 mm. longis, 3-7 mm. latis, ellipticis, obtusis, apiculatis. *Stipulae* 8.5-10.5 mm. longae, subulatae. *Racemi* 9-10 cm. longi, parte superiore dense floriferi. *Bractee* subulato-filiformes, alabastris

longiores, deciduae. *Pedicelli* 2 mm. longi. *Calycis* lobi inaequales, subulati, tomentosi, superiores 3 mm. longi, inferior 5 mm. longus. *Corolla* kermesina (sicca purpurea), tomentosa; vexillum 10-5 mm. longum, 6-7 mm. latum, ovato-oblongum, subtruncato-obtusum; alae 10 mm. longae, 3 mm. latae, oblanceolatae obtusae; carina circa 12 mm. longa, obtusa. *Legumen* immaturum breve, dense albo-tomentosum.

RHODESIA. Manika District, on the Inyanga Mountains, 1800-2100 m., common, *E. Cecil*, 186.

821. *Indigofera inyangana*, *N. E. Brown* [Leguminosae-Galegeae]; affinis *I. rostratae*, Bolus, sed floribus minoribus vexillo suborbiculari alisque latioribus differt.

Planta herbacea, 20-25 cm. alta, caulibus foliis subtus, pedunculis calycibusque pilis albis et brunneis medio affixis tenuiter appresse pubescentibus. *Folia* approximata, 8-15 mm. longa, imparipinnata, 7-13-foliolata, foliolis oppositis, 5-8.5 mm. longis, 2 mm. latis, oblongis, utrinque subobtusis, mucronulatis, supra glabris. *Stipulae* 2 mm. longae, subulatae. *Racemi* axillares, 7.5 cm. longi, parte florifera 2.5 cm. longa. *Bracteae* 4 mm. longae, lineari-subulatae. *Pedicelli* 2-2.5 mm. longi, nigro-pubescentes. *Calyx* profunde 5-lobus, nigro-pubescentis, lobis subulatis, superioribus 1.5 mm. longis, inferiore 2.5 mm. longo. *Corolla* kermesina; vexillum 7 mm. longum, 6 mm. latum, suborbiculare, retusum, extra nigro-pubescentis; alae 6 mm. longae, 2.5 mm. latae, oblique subspathulato-obovatae, glabrae; carina 7 mm. longa, obtusa, brunneo-pubescentis.

RHODESIA. Manika District, Inyanga Mountains, *E. Cecil*, 174.

822. *Indigofera notata*, *N. E. Brown* [Leguminosae-Galegeae]; affinis *I. Zeyheri*, Spreng., sed racemis quam foliis vix longioribus differt.

Fruticulus ramosus. *Rami* graciles, angulati, pilis medio affixis minutissimis appresse pubescentes. *Folia* 10-13 mm. longa, imparipinnata; rachis 5-6 mm. longa, ad axillas foliolorum fasciculis pilorum brunneorum ornata; foliola opposita, 3-4 juga, 4-10 mm. longa, 1.5-2.5 mm. lata, lineari-oblanceolata, obtusa, basi acuta, supra glabra, subtus appresse pubescentia. *Stipulae* minutissimae, deltoideae. *Racemi* 1-1.5 cm. longi, supra-medium 4-6-flori. *Bracteae* minutissimae. *Pedicelli* 1.5-2.5 mm. longi, appresse pubescentes. *Calyx* vix 2 mm. longus, late campanulatus, ad medium 5-dentatus, extra appresse pubescens; dentes deltoidei, acuti. *Corolla* rubra vel rubro-purpurea; vexillum 5.5 mm. longum, 6 mm. latum, suborbiculare, extra appresse pubescens; alae 5 mm. longae, 3 mm. latae, oblique spathulato-obovatae, glabrae, apice minute ciliatae; carina 5.5 mm. longa, obtusa, dorso et marginibus ciliata.

CAPE COLONY. East London Division; Quigney, 60 m. *Schönberg in Herb. Galpin*, 2793.

823. *Dolichos lupiniflorus*, *N. E. Brown* [Leguminosae-Phaseoleae]; affinis *D. malosano*, Baker, sed foliis angustioribus, calyce 5-dentato et vexillo intra ecornuto differt.

Herba circa 1 m. alta, ubique, corolla excepta, appresse pubescens. *Caulis* angulatus. *Folia* longe petiolata, trifoliolata, foliolis 3-5 cm. longis vel ultra, 10-17 mm. latis, oblongis vel lanceolato-oblongis, acutis, basi obtusis, utrinque sericeo-pubescentibus, venis marginibusque fulvis, stipellis subulatis. *Racemi* terminales, sessiles, 23-25 cm. longi, multiflori. *Bracteae* 5-6 mm. longae, subulatae, caducae. *Flores* ad nodos 2 vel interdum 4. *Pedicelli* 4-6 mm. longi. *Calyx* campanulatus, inaequaliter 5-dentatus, basi bibracteolatus, bracteolis 3 mm. longis, subulatis; tubus 3 mm. longus; dentes superiores 1.5 mm. longi, deltoidei, acuti, inferior 3.5-4 mm. longus, deltoideo-subulatus. *Corolla* glabra, violaceo-purpurea; vexillum 16 mm. longum, 10.5 mm. latum, obcordatum, intra eornutum, ungue apice utrinque minute auriculato; alae 16 mm. longae, 5 mm. latae, oblique oblongae, obtusae, unguiculatae; carina 16 mm. longa, 4 mm. lata, obtusa. *Ovarium* ad suturas dense barbatum, stylo glabro, stigmate penicillato.

PORTUGUESE EAST AFRICA. By the railway between Beira and Massi Kessi, *Hon. Mrs. Evelyn Cecil*, 23.

824. *Rhynchosia reptabunda*, *N. E. Brown* [Leguminosae-Phaseoleae]; affinis *R. hirsutae*, Eckl. et Zeyh, sed corolla glabra facile distinguitur.

Caulis herbaceus, repens, pilosus. *Folia* petiolata, trifoliolata; petiolus 3-6 cm. longus, puberulus et laxè pilosus; foliola subaequalia, 3-4.5 cm. longa, 2.5-4 cm. lata, late ovata, obtusa, apiculata, basi leviter cordata, utrinque pubescentia; stipulae 7-11 mm. longae, 1.5-3 mm. latae, falcato-oblongae, subobtusae. *Pedunculi* axillares, 5-17.5 cm. longi, apice racemosi, 2-6 flori, pubescentes. *Bracteae* 4-5 mm. longae, 1 mm. latae, lanceolatae, acutae, pubescentes. *Pedicelli* 3 mm. longi, pubescentes. *Calyx* pubescens; tubus 3 mm. longus; dentes superiores 3-4 mm. longi, lanceolati, acuti; dens inferior 7 mm. longus, lanceolato-subulatus. *Corolla* glabra, lutea; vexillum 8.5 mm. longum, 5.5 mm. latum, late oblongum, emarginatum, unguiculatum; alae 7 mm. longae, 2 mm. latae, oblongae, obtusae, carinae adnatae; carina 8.5 mm. longa, obtusa. *Ovarium* dense tomentosum.

NATAL. Near Charlestown, 1500-1800 m., *Wood*, 5734.

825. *Eriosema distinctum*, *N. E. Brown* [Leguminosae-Phaseoleae]; affine *E. oblongo*, Benth., et *E. Kraussiano*, Meissn., sed foliis et floribus multo majoribus facile distinguitur.

Herba 10-23 cm. alta. *Rami* decumbentes, trigoni, fulvo-pubescentes, 2-4 foliati. *Folia* trifoliolata; petioli 6-20 mm. longi, subfulvo-pubescentes; foliola inaequalia, oblonga vel obovato-oblonga, obtusa, apiculata, viridia, utrinque tenuiter appresse pubescentia, intermedium 5-10.5 cm. longum, 2.5-3.5 cm. latum, lateralia minora. *Stipulae* 12-20 mm. longae, 3-4 mm. latae, lanceolatae, acuminatae, striatae, molliter pubescentes. *Pedunculi* 10-18 cm. longi, subtrigoni, appresse pubescentes, inferne nudi, superne dense racemoso-floriferi. *Bracteae* 6-10 mm. longae, 1-1.5 mm. latae, lanceolatae, longe acuminatae, pubescentes, reflexae. *Pedicelli* 3 mm. longi. *Calyx* campanulatus, 5-dentatus, pubescens; tubus

3 mm. longus ; dentes 3-4 mm. longi, deltoideo-attenuati. *Corolla* rubra vel rubro-purpurea, 12-17 mm. longa ; vexillum late orbiculato-obovatum, pubescens et glandulosum.

NATAL. On a stony hill near Nottingham Road Station, 1500 m., *Wood*, 4398 ; without precise locality, *Wood*, 6357.

826. *Eriosema longipes*, *N. E. Brown* [Leguminosae-Phaseoleae] ; affine *E. Burkei*, Benth., sed foliis tenuioribus minus tomentosus et pedunculis valde compressis differt.

Herba 45 cm. alta., basi decumbens laxè ramosa. *Rami* erecti compresso-subtrigoni, puberuli vel appresse pubescentes, striati, foliosi. *Folia* brevissime petiolata, trifoliolata, infima simplicia ; petioli 2-4 mm. longi ; foliola 6-9.5 cm. longa, 1.3-4 cm. lata, lanceolata vel oblongo-lanceolata, acuta, basi cuneata, viridia, utrinque tenuiter pubescentia. *Stipulae* 8-10 mm. longae, 1.5-2 mm. latae, subfalcato-lanceolatae, acuminatae, striatae. *Pedunculi* 15-20 cm. longi, foliis multo longiores, valde compressi, ultra medium nudi, superne racemoso-floriferi, puberuli, striati. *Bractae* 4-5 mm. longae, 0.7 mm. latae, lanceolatae, longe acuminatae, concavae, valde reflexae, pubescentes. *Calyx* campanulatus, subaequaliter 5-dentatus, fulvo-pubescens ; tubus 3.5-4 mm. longus et latus ; dentes 2 mm. longi, deltoidei, acuti. *Corolla* lutea, 10 mm. longa ; vexillum oblongum, basi biauriculatum, reflexum, pubescens. *Ovarium* dense appresse que hirsutum.

NATAL. On a hillside near Pinetown, 300 m., *Wood*, 5709.

827. *Cucumis Cecili*, *N. E. Brown* [Cucurbitaceae] ; affinis *C. dipsaceae*, Ehrenb., sed foliis acutioribus et fructibus dense setulosis nec echinulatis differt.

Planta herbacea, caulibus petiolis pedunculis cirrhisque breviter setuloso-scabridis. *Folia* longe petiolata, ambitu orbiculata vel rotundato-ovata, leviter 5-loba, acuta, basi cordata, utrinque dense appresse pubescentia. *Flores masculi* fasciculati. *Pedunculus* filiformis, 10-13 mm. longus. *Calyx* campanulatus, setuloso-pubescent, tubo 3 mm. longo, lobis subaequalibus subulatis. *Corolla* 6 mm. longa, ad $\frac{2}{3}$ lobata, lutea, extra nervis setuloso-pubescent, lobis oblongis obtusis. *Staminum* filamenta glabra, ad medium tubi inserta ; antherae 1.5-2 mm. longae, connatae, breviter appendiculatae, loculis rectis minute pubescentibus. *Flores feminei* solitarii. *Pedunculus* circiter 2 cm. longus. *Ovarium* ellipsoideum, dense setulosum, 3-placentiferum ; stylus 2 mm. longus, disco cupulari insertus ; stigmata 1 mm. longa, crassa.

RHODESIA. Manika District, Inyanga Mountains, 1800-2100 m., *E. Cecil*, 225.

828. *Gardenia Saundersiae*, *N. E. Brown* [Rubiaceae-Gardenieae] ; affinis *G. Thunbergia*, Linn. f., sed floribus majoribus et lobis calycis lanceolatis acutis nec spathulatis differt.

Frutex ternatim ramosus, cortice cinereo. *Folia* terna, 2.5-6 cm. longa, 1.2-4 cm. lata, orbiculato-obovata vel oblanceolata, obtusissima, basi cuneata, utrinque glabra ; stipulae in annulum tricrenatum connatae. *Flores* sessiles terminales. *Calycis* limbus

in tubum dentato-crenatum, 6-8 mm. longum, ciliolatum, supra ovarium productus, 8-10-costatus, pubescens, costis alatis; alae 12-20 mm. longae, 4-6 mm. latae, lanceolatae, acutae, superne liberae, erectae, glabrae. *Corolla* hypocrateriformis, 8-9 loba, primum alba, demum lutea, glabra; tubus 7-9.5 cm. longus, cylindricus, fauce ampliata; lobi 4-5 cm. longi, 2.5 mm. lati, subelliptici, obtusi, obliqui. *Stamina* inclusa. *Stylus* 7-9.5 cm. longus; stigma clavatum, pluri-costato-lobatum.

PORTUGUESE EAST AFRICA. Lebombo Mountains, *Saunders*.

Described from specimens received from Mrs. Katherine Saunders, which were raised at Tongaat, Natal, from seeds collected by her son, Mr. Charles Saunders, in the Lebombo Mountains in 1896.

829. *Plectronia Gilfillani*, *N. E. Brown* [Rubiaceae-Vanguerieae]; species foliis orbiculato-ovatis utrinque tomentosis distinctissima.

Frutex circa 1 m. altus, ramosus. *Ramuli* tomentosi, oppositi. *Folia* breviter petiolata, orbiculato-ovata vel elliptica, obtusa, utrinque dense velutino-tomentosa, 2.5-4 cm. longa, 2-4 cm. lata. *Cymae* parvae, axillares, breviter pedunculatae. *Pedicelli* 1-2 mm. longi, pubescentes. *Calyx* 1 mm. longus, subtruncatus, minute 5-dentatus, subglaber. *Corolla* circa 4 mm. diam., extra glabra, intra fauce parce subvillosa vel fere glabra; tubus vix 1 mm. longus; lobi 1.5 mm. longi, 1 mm. lati, ovati, acuti, patentes. *Fructus* glaber, didymus, late obcordatus, compressus, 2-spermus, vel abortu oblique oblongus, 1-spermus.

TRANSVAAL. On Jeppes Town Ridge, near Johannesburg, 1800 m., *Gilfillan in Herb. Galpin*, 6010.

830. *Fadogia obovata*, *N. E. Brown* [Rubiaceae-Vanguerieae]; affinis *F. ancylanthae*, Schweinf., sed foliis obovatis et floribus majoribus differt.

Caulis bifariam puberulus. *Folia* sessilia, opposita vel verticillata, 3-5 cm. longa, 2-3 cm. lata, cuneato-obovata, obtusa vel obtuse apiculata, basi acuta, utrinque glabra; stipula 1-4 mm. longa, e basi lato ciliato subulata. *Pedunculi* axillares solitarii, 1- vel dichotome 2-flori, 1-1.5 cm. longi, glabri. *Calyx* 2.5-3 mm. longus, glaber; limbus subnullus, truncatus. *Corolla* viridi-lutea, glabra; tubus circa 2 cm. longus, 6 mm. diam., curvatus; lobi 5-6, patentes, deltoideo-oblongi, acuti, 5-6 mm. longi, 2.5-3 mm. lati. *Antherae* breviter exsertae.

BRITISH CENTRAL AFRICA. Mashonaland; at Six-mile Spruit, near Salisbury, *Hon. Mrs. Evelyn Cecil*, 141. North Nyasaland and Upper Loangwa River, *Nicholson*.

831. *Cuviera minor*, *C. H. Wright* [Rubiaceae-Vanguerieae]; a speciebus reliquis differt foliis minoribus membranaceis.

Arbor parva. *Rami* cinerascetes. *Folia* ovata vel oblongo-ovata, acuminata, leviter inaequilateralia, basi rotundata vel breviter cuneata, glabra, nervis primariis utrinque circa 6, 11.5 cm. longa, 4.5 cm. lata; petiolus supra canaliculatus, gracilis; stipulae late

triangulares, caducae. *Cymae* axillares, multiflorae, 4 cm. longae; bracteeae oblongae, basi apiceque attenuatae, 8 mm. longae. *Calycis* lobi 5, subfoliacei, lanceolati, 8 mm. longi. *Corollae* tubus 4 mm. longus, intus prope basin annulo pilorum deflexorum instructus; lobi triangulares, caudato-acuminati, 1 cm. longi, extus pilosi, lutescentes. *Stamina* 5, ad sinum corollae loborum affixa; antherae sagittatae, filamentis duplo longiores. *Ovarium* 5-loculare, loculis 1-ovulatis; stylus 8 mm. longus; stigma ampullaeforme.

WEST TROPICAL AFRICA. Gold Coast: Kinaha, *Johnson*, 646.

832. *Pavetta Cecilae*, *N. E. Brown* [Rubiaceae-Ixoreae]; affinis *P. radicans*, Hiern., sed foliis angustioribus corolla multo longiore facile distinguitur.

Suffrutex 15–25 cm. altus, basi procumbens, radicans, superne ramosus. *Rami* lignosi, rufescentes, pubescentes. *Folia* opposita, breviter petiolata, apice ramorum conferta, 2–4 cm. longa, 4–10 mm. lata, lanceolata, subacuta, basi acuta, utrinque pubescentia. *Cymae* terminales, sessiles, 6–9-florae. *Pedicelli* 2–4 mm. longi, pubescentes. *Calyx* 4-dentatus, pubescens; tubus 1 mm. longus; dentes 1 mm. longi, acuti. *Corolla* alba, extra pubescens; tubus tenuis cylindricus, 3 cm. longus, 1–1.5 mm. diam.; lobi 4, patentes, 6 mm. longi, 1.5 mm. lati, lineari-oblongi, obtusi, apiculati. *Antherae* exsertae, 4–5 mm. longae, lineares, patentes vel recurvae. *Stylus* filiformis, longissime exsertus, 4.5 cm. longus vel ultra.

RHODESIA. Matabeleland, at Selukwe, *Hon. Mrs. Evelyn Cecil*, 124.

833. *Pavetta pumila*, *N. E. Brown* [Rubiaceae-Ixoreae]; affinis *P. Cecilae*, *N. E. Brown*, sed glabra foliis latioribus lobis calycinis sexties longioribus et corolla minore.

Suffrutex 15–20 cm. altus, basi procumbens, radicans, superne laxè ramosus. *Caules* vel rami erecti, cinerei, glabri. *Folia* opposita, breviter petiolata, 2.5–6.5 cm. longa, 1–2 cm. lata, oblanceolata, obtusa vel subacuta, basi cuneato-acuta, utrinque glabra; petiolus 2–3 mm. longus; stipulae latae, apiculatae. *Cymae* terminales, sessiles, pluriflorae. *Pedicelli* 3–6 mm. longi, puberuli. *Calyx* 4-lobus; tubus 1.5–2 mm. longus, medio constrictus, ad apicem puberulus; lobi 6 mm. longi, 1 mm. lati, lanceolati, acuminati, minute ciliati. *Corolla* 4-loba, glabra, alba; tubus 15 mm. longus, gracilis, cylindricus, 1–1.5 mm. diam.; lobi 6 mm. longi, 2 mm. lati, lanceolati, acuti. *Antherae* 5 mm. longae, lineares, exsertae, recurvae. *Stylus* filiformis, longissime exsertus, 4.5 cm. longus.

PORTUGUESE EAST AFRICA. In the swamps at Dondo, near Beira, *Hon. Mrs. Evelyn Cecil*, 249!

834. *Psychotria Mahoni*, *C. H. Wright* [Rubiaceae-Psychotrieae]; ex affinitate *Grumileae Kirkii*, Hiern, ramis pubescentibus differt.

Rami teretes, 6 mm. diam., conspicue pubescentes, virides. *Folia* elliptica, apice basique acuta, 15 cm. longa, 5 cm. lata, supra glabra

nitida, subtus (praecipue ad nervos) pubescentia ; petiolus 2 cm. longus ; stipulae triangulares, acutae, 12 mm. longae, deciduae. *Cymae* terminales, corymbosae ; bracteae anguste lanceolatae ; bracteolae nullae. *Calyx* cupularis, dentibus 5 minutis. *Corolla* dilute flava, 8 mm. diam. ; tubus 6 mm. diam. ; faux pilosa ; lobi 4-5, ovati, leviter cucullati. *Stamina* inclusa ; antherae ovoideae. *Stylus* exsertus.

BRITISH CENTRAL AFRICA. Linkangala Stream, Mahon. Flowered at Kew in May, 1902.

835. *Geophila Cecilae*, N. E. Brown [Rubiaceae-Psychotriaceae] ; affinis *G. Afzelii*, Hiern, sed minor foliis obtusioribus pedunculisque quam petiolis longioribus.

Herba parva. *Caulis* tenuis, repens, radicans, glaber. *Folia* longe petiolata, rotundato-cordata, obtusissima, glabra, petiolis 1.5-4 cm. longis, supra pubescentibus, laminis 2-3 cm. longis 1.5-3 cm. latis. *Pedunculi* foliis longiores, 2.5-5 cm. longi, graciles, puberuli. *Capitulum* 4-florum. *Involucrum* bracteae 4, glabrae ; duae exteriores majores, 5 mm. longae, 4 mm. latae, obovatae, acutae ; interiores minores. *Calyx* glaber ; limbus basi annulatus, 5-lobus, inter lobos minute denticulatus ; lobi 1.5-2 mm. longi, lineares, acuti. *Corollae* albae tubus 4 mm. longus, cylindricus, extra puberulus, intra fauce dense barbatus ; lobi 1.5-2 mm. longi, patentes, ovati, acuti, apice dorso gibboso-carinati. *Stamina* inclusa.

PORTUGUESE EAST AFRICA. In the swamps at Dondo, near Beira, under trees, Hon. Mrs. Evelyn Cecil, 254.

836. *Otiophora inyangana*, N. E. Brown [Rubiaceae-Anthospermeae] ; affinis *O. cupheoidi*, N. E. Brown, sed foliis ternis et corolla ad faucem barbata differt.

Herba perennis, 20-25 cm. alta. *Caules* erecti, trigoni, trifariam pubescentes. *Folia* terna, sessilia 1.5-2 cm. longa, 5-7 mm. lata, lanceolata, acuta, utrinque glabra. *Cymae* parvae ad apicem caulis subcapitato-congestae, multiflorae. *Pedicelli* 0.5-1.5 mm. longi, glabri vel subpuberuli. *Calycis* lobi valde inaequales, glabri ; unicus 4-6 mm. longus, 0.5-1.5 mm. latus, lineari-lanceolatus, acutus ; ceteri minuti. *Corolla* 5-loba, glabra, pallide caerulea ; tubus 3-4 mm. longus, fauce barbatus ; lobi 4 mm. longi, 0.5-0.7 mm. lati, lineares, subacuti, glabri. *Stamina* exserta ; filamenta 3.5 mm. longa, glabra ; antherae 1 mm. longae, lineari-oblongae.

RHODESIA. Manika District ; Inyanga Mountains, 1800-2100 m., E. Cecil, 203.

837. *Bothriocline inyangana*, N. E. Brown [Compositae-Vernoniaceae] ; affinis *B. longipedi*, N. E. Brown, sed petiolis multo brevioribus, ramis cymorum gracilioribus, capitulis pedicellatis et involucrio purpurascens facile distinguitur.

Caulis ramosus. *Rami* adscendentes, striati, pubescentes. *Folia* breviter petiolata, 4-6.5 cm. longa, vel ultra, 1.3-2.5 cm. lata, oblongo-lanceolata, acuta, basi cuneata vel subrotundata,

argute serrata, utrinque tenuiter pubescentia; petioli 2–4 mm. longi. *Inflorescentia* trichotomo-corymbosa, ramulis pedicellisque pubescentibus. *Pedicelli* 2–4 mm. longi. *Capitula* 5 mm. diam., 15–25-flora, pedicellata. *Involucri* campanulati bracteae glabrae, minute ciliolatae, apice purpurascens, floribus duplo breviores; interiores 3–3.5 mm. longae, 1–1.5 mm. latae, oblongae, obtusae vel subacutae; exteriores gradatim breviores, ellipticae vel suborbiculares, acutae. *Corolla* 5-fida, purpurea; tubus 2.5–3.5 mm. longus, sparse glanduloso-pubescent; lobi 2–2.5 mm. longi, lineares, acuti, glabri, stylo subaequantes vel paullo breviores. *Achaenia* 1.5 mm. longa, obovoidea, leviter curvata, 5-sulcata, glabra. *Pappi* setae 1–1.5 mm. longae, caducae, scabrae.

RHODESIA. Manika District; Inyanga Mountains, 1800–2100 mm., *E. Cecil*, 227A.

338. *Vernonia bothrioclinoides*, C. H. Wright [Compositae-Vernoniaceae]: ex affinitate *V. karaguensis*, Oliv. et Hiern, recedit bracteis longioribus recurvis, achaeniis tricostatis et pappo uniseriato.

Caulis suffrutescens, leviter costatus, pubescens. *Folia* oblongo-lanceolata, acuta, 6 cm. longa, 1–2 cm. lata, supra scabra vel scaberula, subtus tomentosa, marginibus plus minusve crenulatis. *Capitula* 6–8 mm. diam., plurima, corymbosim disposita. *Bracteae* oblongae, acuminatae, recurvae, longiores 6 mm. longae, 1 mm. latae, exteriores sensim minores, apice purpureo-tinctae, extus pilosae. *Corolla* purpurea, 4 mm. longa, extus pubescens, lobis oblongis. *Achaenia* plano-convexa, tricostata, inter costas pubescentia. *Pappus* uniserialis, corollae aequilongus, scaber.

BRITISH CENTRAL AFRICA. Nyasaland; Namasi, *Cameron*, 40; Mount Chiradzulu, *Whyte*.

339. *Vernonia mashonica*, N. E. Brown [Compositae-Vernoniaceae]; species distinctissima ex affinitate *V. senegalensis*, Less.

Frutex ramosus, ad 1 m. usque altus. *Rami* angulati, glabri vel subpruinosi. *Folia* alterna, 1.5–2.5 cm. longa, 2–10 mm. lata, oblanceolata vel spathulato-oblanceolata, obtusa vel subacuta, integra vel 1–2-dentata, coriacea, utrinque glabra, glanduloso-punctata, reticulato-venosa. *Cymae* plures, sublaevae, corymbosae. *Capitula* pedicellata, 5-flora, circa 1 cm. longa, 6 mm. diam., alba. *Involucri* campanulati bracteae quam flores duplo breviores, oblongae vel elliptico-oblongae, obtusae, brevissime mucronatae, pubescentes, stramineae, apice viridi-notatae. *Corolla* 5-dentata, glandulosa; tubus 5 mm. longus, angustissime infundibularis; dentes 2 mm. longi, lineari-attenuati. *Ovarium* dense glandulosum; stigmata filiformia, hirtella. *Pappi* setae corollo subaequantes, niveae, scabrellae.

RHODESIA. Mashonaland; common at Salisbury, *Hon. Mrs. Evelyn Cecil*, 70; at Umtali, *E. Cecil*, 229.

340. *Pteronia sordida*, N. E. Brown [Compositae-Asteroideae]; affinis *P. glomeratae*, Linn. f., sed capitulis brevioribus, squamis involucris angustioribus et cortice cinereo differt.

Frutex nanus, ramosus, cortice cinereo. *Folia* opposita, fasciculata, 1–5 mm. longa, 0·5–1 mm. lata, lineari-trigona vel subteretia. *Capitula* terminalia, solitaria, 1–1·5 cm. longa, 6–8 mm. diam., 5–9 flora. *Involucri* squamae subquinqseriesiatae, interiores 1 cm. longae, 2–2·5 mm. latae, lineari-oblongae, obtusae, exteriores gradatim minores, apice dorso gibboso-dentatae, virides, membranaceo-marginatae, subnitidae. *Corolla* 8 mm. longa, tubulosa, basi contracta, apice 5-dentata, glabra; dentes 2 mm. longae, lineari-oblongae, acutae. *Ovarium* pilis longis albis appressis dense vestitum. *Pappi* setae numerosissimae, lutescentes, exteriores breviores.

CAPE COLONY. Middelburg Division, 1100 m., *Gilfillan* in *Herb. Galpin*, 5527.

XIX.—PERSIAN GUM.

(*Amygdalus leiocarpa*, Boiss.)

From time to time consignments of gum of dissimilar character appear in the commerce of this country as Gum Arabic, not the least interesting being the subject of this note. Little appears to have been written regarding this product however, but the following details gathered from the *Pharmaceutical Journal*, March 29th, 1890, p. 793, may be quoted, not only as throwing light upon the subject, but also as an illustration of the difficulty frequently experienced in determining the geographical as well as the botanical sources of a trade product. Quoting as his authority Professor E. Sickenberger, the writer of the note referred to says that it appears that quantities of this gum “are sent from Bushire, either “to a small port on the west coast of the Red Sea or to Jedda, in “order that it may be substituted for Kordofan gum. It is thence “conveyed to Assouan and packed in old Kordofan packages and “sold as genuine gum. Owing to its pale colour and the absence “of any suspicion that the gum from Assouan could be other than “good Gum Arabic, a considerable amount has been sold. The gum, “however, is described as not soluble in water, but only swelling “up in it, and as being less brittle than Kordofan gum. Professor “Sickenberger suggests that this Persian gum may be the produce “of *Prunus bokhariensis*, Royle, and *Prunus Puddum*, Roxb. “The specimens of Persian gum that have appeared in the London “market resemble East Indian or Senegal gum of good colour “rather than the white minutely cracked Kordofan gum.”

With regard to the suggestion that this gum may possibly be derived from *P. bokhariensis* and *P. Puddum*, it may be well to state here that the Herbarium contains no specimens of the first mentioned species, and as far as can be ascertained there is no published description of it. In Hooker's *Flora of British India*, Vol. II., p. 315, it is placed under *P. communis*, Huds., var. *insititia*, with the following note:—“I have seen no specimens “of Royle's *P. aloocha* and *bokhariensis*, but have no reason to “doubt that they are referable to this.”

In response to an application made to the India Office, samples of the gums of *P. Puddum* and *P. communis* were collected in the Punjab and forwarded to Kew in July, 1890. These bear little resemblance to the Persian gum, though they agree with it in being insoluble in water.

The Museum contains three samples of Persian gum, all apparently identical. The oldest sample was received as "Wild Almond Gum" so long ago as August, 1854. Another sample formed part of 25 bags of "Persian Gum Arabic" imported from Bagdad and included in the London Drug Sales of June 9th, 1893. The third sample was collected by Dr. O. Stapf in 1885, who says of it:—"I may add that I saw a kind of cerasin (gummi nostras) "being sold in the bazaars at Shiraz for medicinal purposes. It "was called Ketirah-i-Arjen and stated to be derived from the "Arjen shrub (*Amygdalus leiocarpa*, Boiss.). Later I myself "collected it from this species on Kuk Chah Sia, north of Shiraz, "where it was plentiful on the ground underneath a few shrubs "and also on the stems. A sample of it is in the Museum. It "looks externally very like Gum Arabic. The same kind of gum "is also sold at Kirman under the name of 'Djäbd ī Ardjän,' "whilst it is replaced by the gum of a plum ('Samgh-i-âlutschäh') "and of a cherry ('Samgh ī giläs') in Ispahan." (See Andreas und Stolze in Peterm. Geogr. Mitth. Ergänz., B. XVII., II., p. 15.)

From the notes and material obtained by Dr. Stapf it is evident that some if not the greater part of the Persian-Gum of commerce is derived from *Amygdalus leiocarpa*, Boiss.

In the Diplomatic and Consular Report on the trade of Bushire for the year 1905 it appears that there is an increasing export of gum from that port, as the following figures show:—

| — | 1903. | 1904. | 1905. | Increase. |
|------------|---------|---------|---------|-----------|
| | Value. | Value. | Value. | |
| Gum | £38,046 | £64,869 | £70,949 | £6,080 |

J. M. H.

XX.—PERPETUATION OF "POTATO DISEASE" AND POTATO "LEAF-CURL" BY MEANS OF HYBERNATING MYCELIUM.

The sudden and simultaneous appearance of "Potato-disease," caused by *Phytophthora infestans*, De Bary, over widely extended areas in Britain and other countries has hitherto been attributed to the rapid production and diffusion of spores during a period when special meteorological conditions favoured the rapid development of the fungus.

This explanation, however, when carefully considered, proves to be altogether inadequate. When a potato plant infected with the spores of *Phytophthora* is placed under a bell-jar in a very damp atmosphere, subdued light, and high temperature—conditions most favourable to the development of the parasite—it is only after a period of four or five days that the fungus produces fruit on the leaves, and then only at the points of infection. On the other hand the fact is too well known that a field of potatoes or all the potato fields in a certain district which at a given moment appeared perfectly healthy and vigorous, have, under certain climatic conditions, been reduced to a blackened, decaying, foetid condition within 24 hours. Again, in the case of every fungus epidemic proved to be due to the diffusion of spores, the disease always originates from one or more primary centres of infection, and gradually extends, whereas in the case of potato disease the appearance of the epidemic is often simultaneous over a considerable area.

These considerations suggested the existence of some method other than dissemination by means of spores as the cause of such sudden outbreaks of disease. The presence of mycelium can readily be demonstrated in the tissues of diseased potato tubers, and a series of experiments conducted at Kew have conclusively proved that such hybernating mycelium in a tuber is capable, under favourable conditions, of perpetuating the disease.

Three diseased potato tubers showing rusty stains characteristic of the presence of *Phytophthora* mycelium in the flesh were each cut into two equal parts. Each half tuber was planted separately in a plant pot; the same kind of soil and manure, sterilized by steam, was used in all the experiments. Three of the pots were placed in a house having a temperature ranging between 70° and 80° Fahr., in dull light, and with the moisture often at saturation point. Each pot was placed under a bell jar. The three remaining pots were placed in a well-lighted house, without any artificial heat, and with an exceptionally dry atmosphere. These pots were not placed under bell-jars. An equal amount of water was supplied to each of the six pots. The three plants grown under conditions of high temperature, dull light, and much moisture in the air, showed the first indication of *Phytophthora* when the shoots were six weeks old, and a fortnight later the three plants were blackened and destroyed by the fungus.

The three plants grown in the cool, well-lighted, dry house showed no trace of disease at the end of two months, when one of the plants was removed to the warm house and placed under a bell-jar. Within nine days this plant was blackened and killed by the fungus. A fortnight later a second plant was removed from the cool to the warm house and placed under a bell-jar. Within a week of the removal of this plant it was also covered with *Phytophthora*. The third plant continued growing in the cool house for 13 week, and remained perfectly free from *obvious* disease.

Similarly marked results were obtained by using potato tubers produced by a plant that was badly infested with potato "leaf-curl"

(*Macrosporium solani*, Cooke), proving that this disease can also be perpetuated by hybernating mycelium present in the tubers.

The above experiments, in addition to proving that the diseases indicated can be transmitted from one generation to another by means of mycelium present in the tubers, also demonstrate another point of much practical importance, namely, that the absence of *obvious* disease in a crop does not necessarily prove the absence of such disease in a *latent* form.

In the experiments described above, it was known at the commencement that the six half-tubers were all diseased. The three plants grown in the hot, damp, badly-lighted house were promptly destroyed, simply because the conditions indicated were detrimental to the growth of the potato but highly favourable to the rapid development of the fungus, which soon became dominant and destroyed its host-plant. On the other hand, the three potato plants in the cool house grew normally under the lower temperature, less atmospheric moisture and better light, a set of conditions very detrimental to fungus growth; hence, although the parasite was present, it remained entirely in abeyance, and the practical man would, without hesitation, have pronounced the plants free from disease.

Every potato grower of experience can predict almost with certainty the moment when potato disease will appear; the necessary conditions are warm, damp, dull weather, but instead of the sudden outbreak being due to the rapid diffusion of spores, as has hitherto been believed, it is far more probable that in the majority of instances it is due to the existence of mycelium, already present in the tissues, which had hitherto been prevented from manifesting itself in an aggressive form owing to the absence of favourable climatic conditions.

GEORGE MASSEE.

XXI.—NEW ORCHIDS. DECADE 28.

271. *Masdevallia peruviana*, Rolfe; affinis *M. auropurpureo*, Reichb. f., sepalorum tubo lato nec constricto, caudis brevioribus, labello medio carinato, et colore florum distincta.

Folia oblongo-lanceolata, subobtusata, 6–8 cm. longa, 1.5–1.8 cm. lata, basi in petiolum 2.5–4 cm. longum attenuata. *Scapi* subteretes, 6–8 cm. longi, 1–2-flori. *Bracteae* conduplicatae, late oblongae, apiculatae v. obtusae, 8–10 mm. longae. *Pedicelli* 1–1.2 cm. longi. *Sepalorum* tubum late cupulatum, 6–8 mm. longum; lobus posticus triangularis, parvus, cauda tenui, recurva 1.3–1.5 cm. longa; lobi laterales latissime ovati, ad medium connati, caudis tenuibus, recurvis 7–9 mm. longis. *Petala* lineari-oblonga, apice bidentata, 5–6 mm. longa. *Labellum* subpandurato-oblongum,

apice valide recurvum, apiculatum, 6 mm. longum, carinis 2 obliquis ad medium instructis dein attenuatis et prope apicem obsoletis. *Columna* clavata, 6 mm. longa, marginibus alatis.

PERU. Collector unknown.

Flowered in the Royal Botanic Gardens, Glasnevin, in July, 1898, and on several subsequent occasions. The tube of the sepals is light brown, the apex of the lateral sepals red-purple, fading away to whitish near the base, and the petals and lip white tinged with lilac.

272. *Dendrobium* (*Stachyobium*) *compactum*, Rolfe; affine *D. alpestri*, Royle, sed racemis brevioribus et densioribus, bracteis latioribus, et labello minute crenulato, nec inciso-serrato, facile distinguendum.

Herba epiphytica, caespitosa, 4-5 cm. alta. *Pseudobulbi* fusiformes, 3-4 phylli. *Folia* oblonga, inaequaliter biloba, obtusa, 1.5-2 cm. longa, 3-5 mm. lata; basi vaginata, vaginis striatis. *Racemi* terminales v. subterminales, 1.3-2 cm. longi, 5-6-flori. *Bractee* ovato-lanceolatae, acutae, 2-3 mm. longae. *Pedicelli* graciles, 4 mm. longi. *Sepalum* posticum oblongo-lanceolatum, acutum vel acuminatum, 4 mm. longum; sepala lateralalia obliqua, triangularia, acuta, 4 mm. longa, basi 4 mm. lata. *Petala* oblongo-lanceolata, acuta v. acuminata, 4 mm. longa. *Labellum* subtrilobum, recurvum, 5 mm. longum; lobus intermedius ovatus, apiculatus, undulatus et minute crenulatus; lobi laterales oblongi, obtusi, margine minute crenulati; discus obtuse bicarinatus. *Columna* lata, 1.5 mm. longa. *Mentum* conicum, obtusum, incurvum, 5 mm. longum.

YUNNAN. Szemao; Western Forests and Tea Hills, 1500 m., A. Henry, 11752 A, 12752.

Flowered in the collection of Madame Louis de Hemptinne, of Ghent, in December, 1903. The flowers are white, with the lip light green.

273. *Dendrobium* (§ *Clavipes*) *annamense*, Rolfe; affine *D. crumenato*, Swartz, floribus minoribus flavescentibus, labello integro facile distinguendum.

Herba epiphytica. *Caules* patentes vel subpenduli, graciles, circa 4-5 dm. longi, prope basin dilatati et subcompressi. *Folia* oblonga, obtusa, subcoriacea, 5-7 cm. longa, 1.5-2 cm. lata. *Flores* axillares, ad nodos laterales defoliatos fasciculati vel breviter racemosi, saepissime triflori. *Bractee* ovatae, acutae, submembranaceae, 2-3 mm. longae. *Pedicelli* graciles, 1.3-1.5 cm. longi. *Sepalum* posticum ovato-triangulare, acutum, circa 1 cm. longum; sepala lateralalia triangularia, acuta, basi ad columnae pedem in mentum curvatum obtusum circa 1.3 cm. longum extensa. *Petala* lanceolata oblonga, subacuta, circa 1 cm. longa. *Labellum* late oblongum, obtusum, apice leviter crenulatum, basi subattenuatum, circa 1.5 cm. longum; discus laevis. *Columna* latissima, circa 2 mm. longa.

ANNAM. *Micholitz.*

Introduced by Messrs. Sander and Sons, and flowered in their establishment in March, 1906. The flowers are buff-yellow and rather membranous.

274. *Bulbophyllum calabaricum*, *Rolfe*; affine *B. recurvo*, Lindl., sed labello facie papilloso et marginibus ciliatis facile distinguendum.

Rhizoma repens. *Pseudobulbi* approximati, ovoideo-tetragoni, 1·3–2 cm. longi, monophylli. *Folia* oblonga vel lanceolato-oblonga, subobtusata v. apiculata, coriacea, 4–7 mm. longa, 1·3–2 cm. lata. *Scapi* suberecti vel arcuati, 7–13 cm. longi, multiflori. *Bracteae* lanceolato-oblongae, acutae, 3–4 mm. longae. *Pedicelli* 2 mm. longi. *Sepala* triangulari-lanceolata, acuta vel subacuminata, 5–6 mm. longa. *Petala* oblonga, apiculata, minutissime papillosa, 2 mm. longa. *Labellum* oblongum, subobtusum, carnosum, papillosum et ciliatum, recurvum, 1·5 mm. longum. *Columna* latissima; dentes subulati, acuti, vix 1 mm. longi.

W. TROP. AFRICA. Old Calabar, *Holland*.

Sent to Kew by Mr. J. H. Holland, Botanic Garden, Old Calabar; and flowered in the collection in October, 1899. The flowers are light yellowish green, with a dull reddish purple lip.

275. *Polystachya bicolor*, *Rolfe*; a *P. purpurea*, Wight, pedicellis longioribus labelli lobis lateralibus supra medium affixis, a *P. rosea*, Ridl., floribus multo minoribus differt.

Caules caespitosi, 2·5–5 cm. longi, 3–4-phylli, basi crassiusculi. *Folia* lanceolato-oblonga, subobtusata vel inaequaliter bidentata, 4–9 cm. longa, 1–1·7 cm. lata. *Scapi* 7·5–10 cm. longi, vaginis paucis obtecti; panícula laxa, 2·5–5 cm. longa, multiflora, rachi pubescente. *Bracteae* basi latae, apice acuminatae, 1–1·5 mm. longae. *Pedicelli* 4–6 mm. longi. *Sepalum* posticum ovatum, acutum, 3 mm. longum; sepala lateralia obliqua, late triangularia, apiculata, 3 mm. lata. *Petala* obovato-oblonga, apiculata, 3 mm. longa. *Labellum* 4 mm. longum, late unguiculatum, supra medium trilobum; lobi laterales oblongi, obtusi, 1 mm. longi; lobus intermedius suborbicularis, obtusissimus vel minutissime bidentatus, 2 mm. latus; discus omnino farinaceo-pubescent; callus oblongus, depressus, obtusus. *Columna* lata, 1·5 mm. longa. *Mentum* late oblongum, obtusum, fere 3 mm. longum.

SEYCHELLES. Cascade Estate; on rocks in mountains, common, *Thomasset*, 58.

A living plant was also sent to Kew, where it flowered in September, 1903. The pedicels and sepals are light purple, while the petals, lip and column are cream white. It is very distinct from the two other Seychelles species.

276. *Saccolabium rubescens*, *Rolfe*; a *S. ampullaceo*, Lindl., caule altiore, foliis latioribus et subrecurvis, racemis pedunculatis, sepalis petalisque multo minoribus differt.

Caulis erectus, robustus, circa 2·5 dm. altus. *Folia* patentia vel recurva, coriacea, oblonga, inaequaliter et brevissime biloba, 1·2–1·5 dm. longa, 2·5–3·2 cm. lata. *Scapi* suberecti, 1·5–1·7 cm. longi. *Racemi* 7·5–10 cm. longi, multiflori. *Bracteae* ovatae, obtusae, concavae, 1 mm. longae. *Pedicelli* 1·8–2 cm. longi. *Sepalum* posticum late ellipticum, obtusum, vix 4 mm. longum; sepala lateralia ovata, quam posticum latiora. *Petala* late elliptica, obtusa, vix 4 mm. longa. *Labellum* trilobum; lobi laterales transverse oblongi, obtusissimi, incurvi, breves; lobus intermedius ovato-oblongus, subacutus, basi patens, apice incurvus, 1 mm. longus; calcar strictum vel subincurvum, 1 cm. longum. *Columna* brevissima.

ANNAM. Micholitz.

Imported by Messrs. Sander and Sons, in 1903, and flowered at Kew in March, 1906, and shortly afterwards at Glasnevin. The flowers are uniformly light rose-purple in colour.

277. *Sarcanthus inflatus*, Rolfe; a speciebus reliquis labelli calcare inflato segmentis multo longiore differt.

Folia anguste oblonga, crasse coriacea, apice inaequaliter et obtuse biloba, 6–12 cm. longa, 1–1·5 cm. lata. *Panicula* 9–12 cm. longa, multiflora. *Bracteae* late ovatae, subacutae, 1–2 mm. longae. *Pedicelli* 7–8 mm. longi. *Sepala* late oblonga, obtusa, 3 mm. longa. *Petala* oblonga, obtusa, 3 mm. longa. *Labellum* carnosum, trilobum; lobi laterales triangulares, subacuti, 1·5 mm. longi, apice incurvi; lobus intermedius triangularis, subobtusus, 1·5 mm. longus; calcar inflatum, ellipsoideo-oblongum, obtusum, lateribus subcompressum, 5 mm. longum. *Columna* latissima, 1·5 mm. longa; pollinarii glandula hippocrepiformis.

ANNAM. Micholitz.

Introduced by Messrs. Sander and Sons, and flowered in the Royal Botanic Gardens, Glasnevin, in April, 1906. It belongs to the group with bilobed leaves and paniculate inflorescence, but owing to the disproportion between the spur and the rest of the flower, cannot well be compared with any other species. The sepals and petals are green, with a pair of dark brown stripes, the front lobe of the lip light yellow, and the side lobes white, with a purple stain on the side next the column, which extends down the underside of the lip, terminating in a pair of radiating veins.

278. *Listrostachys fimbriata*, Rolfe; species *L. fragrantissimae*, Reichb. f., simillima, sed labelli calcare longiore et tenuiore facile distinguenda.

Folia pendula, anguste oblonga, inaequaliter biloba, obtusa, basi paullo attenuata, coriacea, circa 3–3·2 dm. longa, 4·5–5 cm. lata. *Racemi* penduli, circa 3 dm. longi, multiflori. *Flores* oppositi. *Bracteae* connatae, tubulosae, 2 mm. longae, apice apiculatae vel fere truncatae. *Pedicelli* 5 mm. longi. *Sepala* ovato-lanceolata, acuminata, 1–1·5 cm. longa. *Petala* similia sed minora, margine erosa vel subfimbriata. *Labellum* late panduratum, 1–1·3 mm.

longum, 7-8 mm. latum, apice trilobum : lobus intermedius longe acuminatus ; lobi laterales subdolabriformes, fimbriati ; calcar pendulum, basi gracile, dein subito unilateraliter inflatum, apice attenuatum, subobtusum vel apiculatum, 1-1.3 mm. longum, circa 2 mm. latum. *Columna* latissima, 2 mm. longa.

E. TROP. AFRICA. Uganda, Entebbe : "not very common," Mahon, 5.

Dried and living specimens were sent to Kew by the late Mr. John Mahon, Curator of the Uganda Botanic Station. It has since flowered in the collection. The flowers are translucent white, with a slight greenish tinge. The collector describes it as very floriferous.

279. *Mystacidium Mahoni*, Rolfe : affine *M. xanthopollinio*, Reichb. f., sed labelli calcare valde incurvo limbum parum excedente facile distinguendum.

Caulis elongatus, scandens, 4 mm. diam. ; internodia, 1.3-2 cm. longa, radicante. *Folia* linearia, apice breviter et inaequaliter biloba, 7.5-11 cm. longa, 6-9 cm. lata, subcoriacea. *Racemi* graciles, 7.5-10 cm. longi, subflexuosi, multiflori. *Bracteae* latae, tubulosae, subtruncatae, 2 mm. longae. *Pedicelli* 2-2.5 mm. longi. *Sepala* elliptico-oblonga, obtusa, fere 3 mm. longa. *Petala* orbiculari-ovata, obtusa, fere 3 mm. longa. *Labellum* late obovato-flabellatum, obscure trilobum, minute crenulatum, 3 mm. longum, 4 mm. latum : calcar lineari-oblongum, obtusum, incurvum, circa 4 mm. longum. *Columna* lata, 1 mm. longa ; rostellum triangulare, acutum, 1 mm. longum.

E. TROP. AFRICA. Uganda ; Entebbe, "grows in large interwoven masses," Mahon, 7.

Described from dried specimens sent with the preceding.

280. *Vanilla zanzibarica*, Rolfe ; a *V. africana*, Lindl., foliis elliptico-oblongis apice latis, a *V. crenulata*, Rolfe, labello majore marginibus ad columnam supra medium adnatis differt.

Caules subgraciles, scandentes ; internodia 5-9 cm. longa. *Folia* elliptico-oblonga, breviter acuminata et subobtusa, 7-11 cm. longa, 3-5 mm. lata, coriacea, venis prominentibus. *Racemi* axillares, simplices, circa 2.5-3 mm. longi, multiflori. *Bracteae* ovatae, subobtusae, patentes, 2 mm. longae. *Sepala* elliptico-oblonga, subobtusa, 2-2.5 cm. longa, 10 mm. lata. *Petala* oblonga, subobtusa, 2-2.5 mm. longa, 8 mm. lata. *Labellum* profunde trilobum ; lobi laterales truncati, 1-1.3 cm. longi, apice denticulati, marginibus columnae adnatis tubum latum subsaccatum formantibus ; lobus intermedius late triangulari-ovatus, subobtusus, 1 cm. longus, 9 mm. latus, subconcavus ; crista retrorsa, e foliolis ramentaceis fimbriatis imbricatis composita, linea mediana paullo incrassata supra cristam obscure 3-carinata, infra cristam obscure 5-carinata. *Columna* incurva, 1.6-2 cm. longa. *Capsulae* lineares, graciles, 1-1.5 mm. longae, inodoratae. *Vanilla* sp. [R. N. Lyne in], "The Shemba," Aug., 1898, 1 ; Nov. and Dec., 1898, 2.

E. TROP. AFRICA. Zanzibar; on the Wanda, near Dunga, Lyne.

Interesting as the first East African species of the section *Foliosae*, of which seven species are known from West Africa. It is said to be weak and straggling, and to climb upon the dense scrub. The flowers are described as purplish at the base, but losing their colour as they open, the lip being striped with purple and stiffened by a convex rib which bears a reflexed tuft of creamy yellow hairs one-third of the way down. The fruit is spirally twisted. Dried specimens were sent to Kew by Mr. R. N. Lyne, Director of Agriculture, Zanzibar.

XXII.—CHINESE WOOD OIL.

(*Aleurites Fordii*, Hemsl., and other species of *Aleurites*.)

Chinese Wood Oil has long been known to specialists in this country as one of the most important vegetable products of China. Hitherto it has been accepted without question that *Aleurites cordata*, R. Br., was the species from which this oil was obtained. Recent investigations by Mr. W. B. Hemsley, in the course of a revision by him of the genus *Aleurites*, has led him to conclude that the T'ung Yu of the Chinese—the source of the true Chinese wood oil—is not *A. cordata*, but a very distinct species, *A. Fordii*, Hemsl. It is, however, certain that *A. cordata*, R. Br., affords a similar product. The resumé of his results, supplied by Mr. Hemsley, which is given at the end of this note, will show how intricate the confusion between the various species of *Aleurites* has been. This confusion has been partly the result and partly the cause of a confusion that has prevailed with regard to their economic properties.

In an interesting article on this subject in the *Chemist and Druggist*, May 31st, 1902, which is quoted freely in this note, Dr. A. Henry states that he has met with the T'ung Yu tree wild in the mountainous parts of Hupeh in Central China at elevations of from 500 to 5,000 feet, where it attains a height of about 40 feet. It is largely planted in the mountainous districts in the provinces of Hupeh, Szechwan, Hunan, Chekiang, and Fukien. In Central China it succeeds best in rocky barren spots where there is a thin soil and where farming is impossible, cultivated trees rarely exceeding 20 feet in height. A small tree is said to yield from 100 to 200 lbs. of fruits, each containing three or four large seeds, and little labour is required either in planting the trees or in collecting the fruits. The climate in those parts of China where the tree is most cultivated is an extreme one. The summer is hot, the temperature rising to 100° F. in July and August. The winter is cold, snow often lying on the ground for days, but severe frosts are unknown. The tree is also planted much further south, and will succeed in tropical regions. It soon comes into bearing, the fruits ripening in the autumn; it would

therefore seem to be very suitable for planting in certain of our possessions, such as Ceylon and the Nilgiris, in Natal, and perhaps in the mountainous parts of the West Indies. It might be tried in barren mountainous regions where farming or ordinary planting would be impossible.

Two varieties of oil are obtained from the seeds, distinguished as white t'ung oil, which is cold drawn and is a yellow, transparent, moderately thick oil used in Central China for varnishing furniture and umbrellas, for lighting purposes, and for making oiled paper. The other form is known as black t'ung oil, which is extracted by heat and pressure, and is a thick, blackish, opaque liquid which is cheaper in price than the other kind, and is used for coarser work, as in making putty used in caulking boats, for painting boats, &c.; the latter variety does not appear to be exported.

Wood oil is stated to be the best drying oil known, and to be superior in this respect to linseed oil. The chief use to which it is put in China is for preserving woodwork, to which it imparts a clear glossy appearance. Chinese junkmen use no paint in the upkeep of their vessels—only this oil, which answers the purpose admirably, the boats having a marvellously clean appearance and glistening in the sun like mirrors.

Within the past ten years t'ung oil has been exported in increasing quantities to European and American ports, the Americans being the first to appreciate the qualities of the oil. It is shipped in 4- to 5-cwt. casks, and there is often considerable loss from leakage—sometimes as much as 35 per cent.; therefore efforts are being made to induce the Chinese to employ casks of smaller capacity.

The oil is frequently adulterated with, it is believed, bean oil extracted from the seeds of *Glycine hispida*, Maxim., which seriously affects its drying properties. Smaller quantities of the oil are shipped from Canton, this being considered of superior quality to that exported from Hankow.

Large quantities of oil are also exported from Wenchow to Hong Kong, thence to Singapore for distribution.

In connection with this industry it appears that there is great difficulty in obtaining barrels at Hankow, consequently an American firm exports shooks from New York and has erected machinery on the spot for setting them up.

With regard to the uses of t'ung oil in Europe and America, it is known that it is employed to a considerable extent in one or two industries and is also being experimented with in others, but much secrecy is maintained regarding the matter. So far as can be gathered, it is employed in linoleum factories, as a substitute for linseed in some industries, and is also believed to form the basis of a varnish to compete with that produced from copal.

It may be noted that this oil has poisonous properties; the refuse cake is employed as manure in China.

Messrs. Dalton & Young, of Fenchurch Street, have courteously permitted the publication of the following table supplied by them,

which gives particulars of the shipments of Hankow wood oil during the year 1905 :—

| — | Hamburg. | Marseilles. | Antwerp. | Trieste. | London. | Rotterdam. | America. | Havre. | Liverpool. | Leghorn. | Dunkirk. |
|----------------|----------|-------------|----------|----------|---------|------------|----------|--------|------------|----------|----------|
| | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. | Pcls. |
| January | 170 | 181 | 450 | — | 288 | — | 5,219 | 82 | — | — | — |
| February | — | — | — | — | 83 | — | 1,511 | — | — | — | — |
| March | — | — | — | — | 85 | — | — | 127 | — | — | — |
| April | — | — | — | — | — | — | 1,022 | — | — | — | — |
| May | 348 | — | 171 | — | 88 | — | 6,412 | 167 | — | — | — |
| June | 569 | 345 | 169 | 101 | — | 84 | 6,163 | — | — | — | — |
| July | 1,963 | — | 2,861 | — | — | — | 7,432 | 441 | — | 88 | — |
| August | 2,810 | — | 1,761 | — | 1,035 | — | 4,009 | 94 | — | — | 36 |
| September .. | 3,594 | — | 2,825 | — | 2,211 | 278 | 1,540 | — | — | — | — |
| October | 1,012 | — | 1,162 | 168 | 1,772 | 83 | 3,073 | — | — | — | — |
| November .. | 1,521 | — | 1,182 | — | 1,006 | 174 | 9,765 | — | — | — | — |
| December .. | 608 | — | 168 | — | 1,863 | 253 | 3,368 | — | 420 | — | — |
| | 12,595 | 526 | 10,749 | 269 | 8,521 | 872 | 49,514 | 911 | 420 | 88 | 36 |

Total, 84,501 piculs for 1905 against 84,249 piculs, 1904.

" " " 89,447 " 1903.
 " " " 102,021 " 1902.
 " " " 23,636 " 1901.

Under the name of Balucanat or Balucanag a sample of an oil seed from the Philippines imported into Liverpool was received at the Museum in 1891. Subsequently, in 1897, what appears to be the same thing came into the London market, said to have been shipped from Hong Kong. These are both believed to be derived from *Aleurites trisperma*, Blanco, a native of the Philippines.

J. M. H.

REVISION OF THE SYNONYMY OF THE SPECIES OF ALEURITES.

Much confusion prevails in botanical literature as regards the application of the names of the species of *Aleurites*. This is largely due to the fact that the common Chinese species, the T'ung Yu or Wood Oil Tree, has hitherto been erroneously regarded as identical with the species, *Aleurites cordata*, R. Br., originally described by Thunberg as *Dryandra cordata*. Another source of error, but of a different kind, has been the assumption, especially by earlier writers, that *Dryandra cordata*, Thunb., and *Vernicia montana*, Lour., which are in reality identical, were

different trees. The results of a careful study of the material available and of the literature of the subject are here briefly summarised.

1. *Aleurites cordata*, R. Br. ex Steud. Nomencl. Bot., ed. 2, vol. i. (1840), p. 49; Muell. Arg. in DC. Prodr. vol. xv., 2 (1866), p. 724.

Dryandra cordata, Thunb. Fl. Jap. (1784), p. 267, t. 27.

Dryandra oleifera, Lam. Encycl., vol. ii. (1786), p. 329, non Wall. Cat.

Elaeococca cordata, Blume, Bijdr. (1825), p. 618.

Vernicia montana, Lour. Fl. Cochinch., ed. 1, vol. ii. (1790), p. 587.

Dryandra Vernicia, Correa in Ann. Mus. Par., vol. viii. (1806), p. 69, t. 32.

Aleurites Vernicia, Hassk. in Flora Jahrg. 15, vol. ii. (1842), Beibl. 2, p. 40.

Aleurites japonica, Blume ex Miq. in Ann. Mus. Bot. Lugd.-Bat., vol. iv. (1868), p. 120.

Aleurites verniciflua, Baill. Hist. Pl., vol. v. (1874), p. 116.

Elaeococcus Vernicia, Adr. Juss. ex Spreng. Syst. Veg., vol. iii. (1826), p. 884.

Elaeococca verrucosa, Adr. Juss. Euphorb. Gen. Tent (1824), p. 38, t. 11, f. 35, quoad flores tantum.

There are specimens of this in the Kew Herbarium from Japan, Formosa, Hainan, and Tongking, and cultivated specimens from Hong Kong raised from seed obtained from Cochinchina; but none from the mainland of China. Shirasawa, the most recent Japanese authority (Iconographie des Essences Forestières du Japon, vol. i., p. 93), treats this as a cultivated tree in Japan.

It is possible that some of the writers cited above, especially those dealing with cultivated specimens, had not the true *A. cordata* under observation. Indeed, it is probable that they had not, because the one cultivated in India in Wallich's time was not that species.

A. cordata, as compared with *A. Fordii*, with which it has been confused, has relatively narrow petals, deeply divided styles, and a wrinkled fruit, as figured by Correa. The leaves, too, are thinner in texture, and commonly lobed in the flowering branches.

2. *Aleurites Fordii*, Hemsl. in Hook. Ic. Pl. tt. 2801 et 2802, ined.

Aleurites cordata Muell. Arg. in DC. Prodr. vol. xv., 2, p. 724, pro maxima parte; Hemsl. in Journ. Linn. Soc., vol. xxvi., p. 433, præter *Elaeococcum verrucosum* partim, syn. omn. excl., et auctorum aliorum multorum, saltem pro parte.

Elaeococca verrucosa, Adr. Juss. Euphorb. Gener. Tent. t. 11, quoad fructum et semen.

Dryandra oleifera, Wall. Cat. n. 7958; Hook. f. Fl. Brit. Ind., vol. v., 1, p. 384; non Lam.

There are specimens of this at Kew, from the Chinese Provinces of Chekiang, Kiangsi, Fokien, Hupeh, and Yunnan, and cultivated specimens from Hongkong and India.

In *A. Fordii*, the flowers are developed before the entire leaves; the petals are broad and rounded; the styles are very shortly bifid, and the apiculate capsule is not wrinkled.

3. *Aleurites triloba*, Forst. Char. Gen. (1776), p. 112, cum ic., et Prod. Fl. Ins. Austral., p. 68.

Aleurites moluccana, Willd. Sp. Pl., vol. iv. (1805), p. 590; Muell. Arg. in DC. Prodr., vol. xv., 2, p. 723.

Aleurites commutata, Geisel. Crot. Monogr., p. 82.

Aleurites Ambinuz, Pers. Syn., vol. ii., p. 579.

Aleurites cordifolia, Steud. Nomencl. Bot., ed. 2, vol. i., p. 49, non *Dryandra cordata*, Thunb.

Aleurites lobata, Blanco, Fl. Filip., ed. 1, p. 756.

Aleurites lancifolia, Blanco, op. cit., p. 757.

Camirium cordifolium, Gærtn. Fruct., vol. ii., p. 195, t. 125, f. 2.

Camirium oleosum, Reinw. ex Blume, Cat. Gew. Buitenz., p. 104.

Jatropha moluccana, Linn. Sp. Pl., ed. 1 (1753), p. 1006.

Malaya and Polynesia, and naturalised in many other tropical countries.

4. *Aleurites trisperma*, Blanco, Fl. Filip., ed. 1, p. 755.

Aleurites Saponaria, Blanco, Fl. Filip., ed. 2, p. 520; ed. 3, p. 156, t. 296; Nov. App., p. 191.

Philippine Islands.

The seeds of this species are imported under the name of *Balucanag*, and they are so much like those of *A. cordata* as to have been mistaken for them.

W. B. H.

XXIII.—MISCELLANEOUS NOTES.

MR. G. H. PRING, lately a member of the gardening staff of the Royal Botanic Gardens, Kew, has, we learn from the *Journal of Horticulture*, been appointed orchid grower at the Missouri Botanic Gardens, St. Louis, U.S.A.

J. B. LOUIS PIERRE.—This eminent French botanist, who died in Paris, October 30, 1905, deserves some record here, both as a worker at Kew and as a generous donor to the Herbarium and Library. Several lengthy biographical notices of Pierre have appeared, but the following autobiographical note, extracted from

a letter written to the present Director when he was Superintendent of the Calcutta Botanic Garden, supplies information as to a phase in Pierre's life of which little is known :—

“ En effet, après des études incomplètes, après avoir été sucrier “ à l'île Bourbon jusqu' à l'âge de 31 ans, des revers de fortune “ m'ont conduit dans l'Inde, les ressources de mon pauvre pays “ ne m'y promettant aucun avenir. C'est alors que grâce à la “ bonté, à la bienveillance toujours soutenue du bien regretté “ Docteur Thomas Anderson j'ai été attaché à l'herbier de Calcutta “ où j'ai pris goût à la botanique et m'y suis réfugié comme dans “ un couvent espérant échapper aux hasards de la fortune. Les “ deux années passées dans votre herbier m'ont permis d'avoir une “ teinture des choses botaniques. Cependant déjà, dans son voyage “ à Java le docteur T. Anderson avait traité avec Mr. Kurz et je “ dus nécessairement quitter le jardin botanique quand ce regretté botaniste vint prendre à la fin de 1864 les fonctions “ d'assistant. J'allai alors en Cochinchine et pendant les 13 ans “ que j'y passai, au Jardin Botanique de Saigon, où tout était à “ créer, où je dus être à la fois jardinier et botaniste et agriculteur, “ contre le gré de l'administration et à mes propres frais, j'ai pu, “ sous la nécessité d'introduire au jardin les plantes de la région, “ exécuter des voyages pendant lesquels j'ai pu réunir l'herbier “ du Cambodge et de la Basse Cochinchine.”

Pierre's magnum opus is the “*Flore forestiere de la Cochinchine*,” in connection with which he published numerous separate papers embodying the results of subsidiary investigations; but he also published largely on the flora of the French Congo. From 1865 to 1877 he devoted all the time he could spare to collecting in Cochinchina and the adjoining countries. He then returned to Europe and commenced his preliminary studies at Paris, Kew, and elsewhere. Unfortunately, the scale on which the work was planned and the comprehensive extent of the author's investigations outside his own area, rendered completion impossible. It appears that the French Colonial Government have expended a sum exceeding 300,000 francs (£12,000) on this work, of which 25 fasciculi have been issued. The whole consists of 400 large folio plates, crammed full of figures, with detailed descriptive letterpress; it deals with the natural orders from *Magnoliaceae* to *Leguminosae*, arranged nearly as in Bentham and Hooker's “*Genera Plantarum*.” So far as it goes, it is of immense value to students of the Indian and Malayan trees, but it is unfortunate that the figures are so crowded as to be confusing, and the lithography is coarse and unattractive. Pierre has left, we are told, more unpublished work than he published, and all his extensive African as well as Asiatic collections are left to the Paris Museum. He spent much time in the investigation of the anatomy of the petiole, and proposed a classification based upon the presence of one, two, or more woody bundles. Besides copious notes, sketches, and analyses, there are upwards of 10,000 microscopic preparations belonging to his collections, illustrating especially the anatomy of the petiole.

Alterations near Kew Palace.—The most important alteration made in the grounds during the past planting season was in the precincts of Kew Palace. The old stables have been demolished and the wall surrounding the yard in which they stood has been pulled down also. The space thus occupied is now levelled over and sown with grass seeds, and the boundary fence that separated the Palace grounds from the Gardens proper has been set back to the building itself. These alterations have resulted in the acquisition of a spacious lawn for the use of the public, and they have also brought the Palace more fully into view and made it more accessible. The interesting history of the building and its charming architectural features made these objects very desirable. In order to hide the new boundary fence, and to block out as much as possible any view of Brentford, a new shrubbery was made. To produce an immediate effect, a large number of fine trees and shrubs were brought from other parts of the Gardens—Holm oaks, yews, hollies, &c.—several weighing (with soil attached) from five to seven tons.

Himalayan House.—The north wing or Himalayan division of the Temperate House was built in 1899 for the accommodation of Himalayan, Chinese and Japanese plants. It was furnished with the assistance of Mr. D. H. Shilson, of Tremough, Cornwall, and others, Himalayan rhododendrons being largely used. These were planted in borders of soil procured in the neighbourhood, which, however, did not prove suitable. It was therefore replaced last winter with a mixture of heather-peat and the sandy top-spit of Kew soil, this mixture having proved suitable for rhododendrons in the borders outside at Kew. The operation necessitated the removal of all the plants, some of which proved unfit to be used again; they were consequently replaced by additional specimen rhododendrons and other plants for which Kew was again indebted to the generosity of Mr. Shilson, and also to Mrs. Coryton, Pentillie Castle, St. Million, Cornwall, and Mr. J. T. Bennett-Poë, Holmwood, Cheshunt.

Umbrella Pine.—The “Umbrella Pine,” *Sciadopitys verticillata*, a figure of which is given in the *Botanical Magazine*, t. 8050, prepared from the larger of the two examples in the Kew collection, was scarcely known in gardens until Messrs. J. Veitch & Sons obtained seeds of it from Japan and raised a batch of plants from them in their Coombe Wood Nursery. The two plants above named both came from this nursery, and we have now to thank Messrs. J. Veitch & Sons for a generous gift of 12 more beautiful trees of this most interesting conifer, which had been grown in their nursery for 25 years. They are now planted in a group on the west side of the pagoda vista.

The Kew Salicetum.—The collection of willows at Kew is a very extensive one, probably, indeed, the richest in existence. At one time planted on the piece of ground now occupied by the collection

of ashes, it was afterwards transferred to the margins of the lake, where, for the most part, it still remains. No place, of course, is so well adapted for the cultivation of willows as one by the side of water. But for so large a number of species, varieties and hybrids as is grown at Kew, more room is needed than the lake affords, without completely shrouding its banks. The picturesque features of the lake at Kew, however, are so delightful and so generally admired that it would be a pity to obscure them in any way. For these reasons it has been decided to found a new *Salicetum*. It is to occupy a belt of ground in the Queen's Cottage Grounds extending from near the Isleworth Ferry Gate to the Old Deer Park. It borders the Ha-ha near the towing path, but is not yet open to the public. The soil here is moist and fairly good, and there is every reason to believe that willows will thrive. As a commencement, about 200 plants were put out during the spring; these will be added to as occasion offers until the entire botanical collection is transferred.

Trees struck by lightning.—A severe thunderstorm was experienced at Kew on the evening of May 8, during which two trees were struck by lightning; one, a *Robinia Pseudacacia*, standing between the Palace and the Herbarium and about 50 yards from the river; the other, a common elm, one of a group of elms near the Brentford Ferry Gate and about 100 yards from the river. The *Robinia* is 60 feet high with a trunk 2 feet in diameter which is forked 4 feet from the ground, the two main branches rising more or less parallel for about 35 feet and then forking again. The larger of these branches, some 15 inches in diameter, was struck by the lightning, which stripped it completely of its bark, scattering the fragments in all directions to a distance of about 30 yards from the tree and splitting it from the fork above to where it joins the main trunk, the fracture being about 30 feet long. The other main branch of the tree was uninjured. The elm is a fine tree about 90 feet high with a trunk 4 feet in diameter. The lightning made two straight splits or bruises in the bark on opposite sides of the trunk for about 40 feet from the base upwards. The bark is about an inch thick and is of course very tough; the wood below the bark does not appear to have been injured. In both trees the upper parts are apparently uninjured. In August, 1895, a Kew deodar, 45 feet high, was destroyed by lightning.

Hand-list of Ferns and Fern Allies.—A new edition of the *Hand-list of the Ferns and Fern Allies cultivated in the Royal Botanic Gardens, Kew*, has been issued. Since the publication of the previous edition in 1895 some change has taken place in the composition of the Fern collection. The species that have been acquired since 1895 are included in the new edition; those not now in cultivation at Kew have been omitted. A feature of the new edition is the provision of references to publications in which reliable figures of some of the species may be found.

The preface to the previous edition, which includes an interesting table prepared in 1867 by Mr. J. G. Baker, F.R.S., to show the percentage of the total number of ferns that had been collected in different parts of the world, is reprinted. In the preface to the new edition there is a similar table drawn up by Mr. C. H. Wright, A.L.S., to whom the preparation of the list for the press was entrusted, which shows the percentages to be derived from our present knowledge of the groups dealt with. It is not yet possible to provide absolute percentages, but those in Mr. Wright's table, which are given for comparison with those in Mr. Baker's earlier one, may be taken as approximately accurate.

The tables referred to, showing percentages of the total number of ferns found in different parts of the world, are as follows :—

A.—Drawn up by Mr. J. G. Baker, F.R.S., in 1867.

| | | | | | |
|-------------------------------------|-----|-----|-----|-----|-------------|
| Arctic Zone | ... | ... | ... | ... | 1 per cent. |
| Europe | ... | ... | ... | ... | 4 " |
| Temperate Asia, including Himalayas | ... | ... | ... | ... | 18 " |
| Temperate North America | ... | ... | ... | ... | 5 " |
| Temperate South Africa | ... | ... | ... | ... | 7 " |
| Australia and New Zealand | ... | ... | ... | ... | 9 " |
| South Temperate America | ... | ... | ... | ... | 5 " |
| Tropical Africa | ... | ... | ... | ... | 15 " |
| Tropical Asia | ... | ... | ... | ... | 39 " |
| Tropical America | ... | ... | ... | ... | 42 " |

B.—Drawn up by Mr. C. H. Wright, A.L.S., in 1906.

| | | | | | |
|---|-----|-----|-----|-----|--------------|
| Arctic Zone | ... | ... | ... | ... | ·4 per cent. |
| Europe | ... | ... | ... | ... | 2·5 " |
| Temperate Asia, including the Himalayas | ... | ... | ... | ... | 25·5 " |
| above 8,000 ft. | ... | ... | ... | ... | ·8 " |
| North Africa, Canary Islands | ... | ... | ... | ... | 3·2 " |
| Temperate North America | ... | ... | ... | ... | 4·5 " |
| Temperate South Africa | ... | ... | ... | ... | 6·9 " |
| Australia and New Zealand | ... | ... | ... | ... | 10·8 " |
| Polynesia | ... | ... | ... | ... | 2·7 " |
| Temperate South America | ... | ... | ... | ... | 15·2 " |
| Tropical Africa and Mascarene Islands | ... | ... | ... | ... | 34·8 " |
| Tropical Asia | ... | ... | ... | ... | 46·4 " |
| Tropical America | ... | ... | ... | ... | |

Botanical Magazine for January.—The plants figured are :—*Asparagus Spengeri*, Regel; *Cynorchis compacta*, Reichb. f.; *Oxalis adenophylla*, Gill.; *Colchicum crociflorum*, Regel; and *Wittmackia lingulata*, Mez. The *Asparagus* is figured in the fruiting state; the flowering state of the same plant had previously been figured under the name *A. ternifolius*, Hook. f. The species is of as great decorative value when in fruit as when in flower. *Cynorchis compacta* is a graceful little terrestrial orchid first discovered in Natal by Mr. J. Sanderson about 1869, and rediscovered in 1895 by Mr. J. M. Wood. The plants figured were

presented to Kew by Messrs. Sander & Sons. *Oxalis adenophylla*, a native of Chili, closely allied to *O. enneaphylla*, Cav., from Fuegia and the Falkland Islands, from which it differs chiefly in having a bulb-like rootstock and differently coloured petals, is a graceful species with rose-coloured purple-eyed flowers. The plant figured was presented to Kew in 1902 by Mr. H. J. Elwes. *Colchicum crociflorum* is a beautiful little species with crocus-like flowers, the pure white ground of each lobe relieved by a broad central band of pink which gradually becomes dark purple. The corms from which the plants figured were raised were imported from Kokan by Mr. C. G. van Tubergen, jun., of Haarlem. *Wittmackia lingulata* is a rather striking American plant first described as a species of *Bromelia* by Plumier in 1703, and included by Philip Miller in the 7th edition of his Dictionary as in cultivation in 1759. It seems, however, never to have been commonly cultivated and it has rarely been sent home by collectors. The plant figured was grown in the Royal Botanic Gardens, Glasnevin, and communicated by Mr. F. W. Moore.

Botanical Magazine for February.—*Eulophia nuda*, Lindl., is a very variable species, native of India, (where it is widely distributed), Ceylon, and Yunnan in Western China. Its flowers are rather large and vary in colour from rose-purple to pink and pale green. The figure was prepared from plants presented to Kew by Mr. A. H. Hildebrand, C.I.E., late Superintendent of the South Shan States. *Saxifraga scardica*, Griseb., from the Balkan Peninsula, is similar to, but more showy than, *S. burseriana*, L. The plants figured were purchased from Mr. F. Sündermann, of Lindau, Bavaria. *Iris sieheana*, Lynch, is one of Mr. W. Siehe's introductions from Asia Minor. It chiefly differs from *I. persica*, Linn., in the colour of the flowers, which are silvery-gray, densely covered with fine reddish lines. At Kew it commences to flower in a south border in February. *Lonicera pileata*, Oliv., native of Central and Western China, whence it was recently introduced by Messrs. James Veitch & Sons, is a dwarf evergreen species belonging to a small section characterized by the calyx possessing a curious cap-like production at its base. It is quite hardy at Kew, where its small pale yellow flowers appear in April. The Chinese *Prunus triloba*, Lindl., is an old inhabitant of English gardens, having been sent to Europe by Fortune about the middle of last century. The plant figured was raised from seed received from Prof. Sargent in 1890. The double-flowered form of this species is one of our best hardy flowering shrubs.

Botanical Magazine for March.—*Arachnanthe annamensis*, Rolfe, is a particularly striking orchid which has recently been introduced from Annam by Messrs. F. Sander & Sons, of St. Albans. It flowered in the Royal Botanic Garden, Glasnevin, in June, 1905. The pretty *Erica terminalis*, Salisb., is a hardy species from Southern Europe, well-known in gardens under the name of *E. stricta*. *Lonicera tragophylla*, Hemsl., was figured from a

specimen sent by Messrs. Veitch in June, 1905. It is quite hardy and is the most showy of all the Chinese species, resembling the European *L. Caprifolium*. *Polygala apopetala*, T. S. Brandege, is a handsome shrubby or arborescent species from Lower California, where it is abundant in the Sierra de Laguna. The specimens, bearing long racemes of bright rose-purple flowers, were communicated by Sir Thomas Hanbury, K.C.V.O., of La Mortola. *Ceropegia fusca*, C. Bolle, is a native of the Grand Canary, where it has recently been re-discovered through the instrumentality of Mr. Walter Ledger, of Wimbledon, who sent the plant to Kew from which the drawing was prepared. It is somewhat anomalous in habit, and when not in flower might easily be mistaken for one of the succulent-stemmed Euphorbias.

Botanical Magazine for April.—*Nepenthes Phyllamphora*, Willd., is interesting as being the most widely distributed of all the species of the genus and the first to be cultivated at Kew, having been introduced in 1789. It is found over a very wide area in Eastern Tropical Asia and Western Polynesia. Its pitchers are nearly cylindrical, and are from 3 to 7 inches long. The Kew plant figured came from the Island of Hainan, South China, and was sent by Mr. C. Ford, I.S.O., in 1894. *Gladiolus carmineus*, C. H. Wright, is a new South African species allied to *G. hirsutus*, Jacq. Bulbs were received at Kew in 1903 from the Hon. Sir C. Abercrombie Smith, Controller and Auditor General, Cape of Good Hope. *Ligustrum strongylophyllum*, Hemsl., is a distinct species with small suborbicular or ovate leaves and large terminal inflorescences. A plant purchased from Messrs. James Veitch & Sons in 1897 flowered at Kew in July, 1905. It is a native of Central China. *Cypripedium tibeticum*, King, is a terrestrial species, native of Eastern Tibet and Western China. The cultivated plants were received by Messrs. Veitch from Western Szechuen in April, 1905, and flowered in the open air at Coombe Wood in the following June. *Callopsis Volkensii*, Engler, is a stemless plant with cordate leaves and white spathes about an inch long. It belongs to the *Aroidae* and is a native of German East Africa. The plant figured was received from the Berlin Botanic Gardens in 1905.

Botanical Magazine for May.—*Lilium Duchartrei*, Franch., is a fine addition to the number of handsome Lilies previously brought into cultivation, several of which, like the present one, are natives of China. Bulbs of *L. Duchartrei* were introduced from West Szechuen by Messrs. James Veitch & Sons, who supplied the material figured. *Primula cockburniana*, Hemsl., is another of Messrs. Veitch's introductions from China, where it grows at high altitudes in West Szechuen. It is chiefly remarkable on account of the colour of the flowers—a rich orange-red, which is not accurately represented in the figure. *Listrostachys hamata*, Rolfe, is a distinct new species from Tropical West Africa, allied to the South African *L. arcuata*, Reichb. f. It is peculiar in having a hooked tip to the spur. This interesting plant was included in a small collection of

orchids received at Kew from Lagos in 1899, and presented by Mrs. W. T. Martin. *Genista dalmatica*, Bartl., native of the North-Western Balkan Peninsula, is a small rigid spinous shrub with terminal racemes of yellow flowers. *Euphorbia lophogona*, Lam., is a curious plant from Madagascar. Its stem is succulent except the woody base, five-angular, and crested on the angles with the deeply-cut persistent stipules. The cymes are large, on erect peduncles, and the upper pair of bracts of each cyathium are pink or white. The Kew plant was received from the late Mr. Godefroy-Lebœuf.

Catalogue of Portraits of Botanists.—An addition to the series of *Hand-lists* to the various collections in the Royal Botanic Gardens, of much interest and value, has been issued under the title *Catalogue of Portraits of Botanists exhibited in the Museums of the Royal Botanic Gardens*. In a preface, Sir William Thiselton-Dyer, to whom all botanists will feel indebted for the inception of the catalogue, gives an account of the formation of this in many ways unique collection, and explains the object and scope of the work. The gratitude of workers in every field of botanical activity, who are interested in the personalities of those who have laid the foundations on which their own work is built, will also be extended to Mr. J. D. Milner, for the admirable manner in which the catalogue has been prepared. The preface is as follows :—

“ The collection of portraits of botanists at Kew is probably unique. It has always been regarded with much interest by visitors to the establishment, especially by those from the Colonies, and the interest to which it appeals is varied ; it may be historical as in the case of the men who were pioneers in the scientific exploration of our Indian and Colonial possessions ; or literary in respect to the great founders of different branches of botanical science ; or scientific in regard to the men who have in more recent times conspicuously advanced its progress.

“ The history of the collection is brief. It was commenced in the early part of the last century by Sir William Hooker, when Regius Professor of Botany in the University of Glasgow. In 1841 he was appointed the first Director of the Royal Botanic Gardens on their becoming a national establishment. He brought the collection with him. The following account is given of it in a memorandum which he drew up shortly before his death in 1865 :—

“ ‘ Of Portraits of Botanists mine is the only extensive collection and it is very valuable. It consists of 17 Chalk Drawings, chiefly by MacNee, of Glasgow, a few Oil Paintings and Miniatures, numerous engravings, lithographs, silhouettes, &c., of distinguished Botanists, also some Bronze and other medals, medallions, &c., amounting to about 100.

“ ‘ A considerable number of Chalk Drawings having been lent by me to the Museums of Economic Botany in the Royal Gardens, are now suspended on the walls of the Staircase of the new Museum. They are all of public interest in a scientific

“ ‘point of view, and their value can be easily ascertained. I
 “ ‘desire that they should be offered for purchase to Her Majesty’s
 “ ‘Government.’

“ The Government eventually decided to purchase it for Kew
 “ with the rest of Sir William Hooker’s collections. Provision was
 “ made in a supplementary estimate for 1866-7. The sum given
 “ was £1,000, but the actual collection purchased appears to
 “ have been larger than that indicated in Sir William Hooker’s
 “ memorandum.

“ It has since been added to by occasional purchases. But the
 “ main increase has been by gifts and bequests. This alone is
 “ sufficient evidence of the appreciation of the collection by the
 “ intelligent public, or at any rate by the botanical world. It
 “ may be noted that as far as available the portraits are cited in
 “ Britten and Boulger’s *Biographical Index of British and Irish*
 “ *Botanists*.

“ When the collection was small it was easily displayed on the
 “ walls of the old staircase of the principal Museum (No. I.). But
 “ as it grew somewhat indiscriminately it overflowed to adjoining
 “ walls and ultimately to other buildings. It became obvious that
 “ this could not be continued indefinitely. It was therefore decided
 “ to divide it into an exhibited series and one which could be
 “ readily consulted in the library. In each case the portraits are
 “ as far as possible mounted on a uniform plan and arranged
 “ alphabetically ; in the latter they are kept in portfolios.

“ In 1904, with a view to the preparation of the present catalogue,
 “ the exhibited collection was carefully revised. Regard was had,
 “ in this, to the relative eminence of the persons represented and
 “ in some degree to the artistic merit of the portraits themselves.
 “ Those, however, of men who had had historic or close personal
 “ relations with the establishment were, as far as possible, included.

“ The crayon portraits executed for Sir William Hooker by
 “ Sir Daniel MacNee in his youth are of exceptional interest.
 “ They represent the very remarkable group of men who, largely
 “ under the influence of Sir William Hooker, laid the foundation
 “ of the botanical traditions of modern Kew.

“ By the kind permission of Lionel Cust, Esq., M.V.O., F.S.A.,
 “ Director of the National Portrait Gallery, the present catalogue
 “ has been drawn up by Mr. James D. Milner, the Clerk and Acting
 “ Assistant Keeper and Secretary, in his leisure time. Not merely
 “ has it had the advantage of being prepared by a practised hand,
 “ but the form and method adopted enable it to take its place
 “ beside those of other collections.

“ Mr. Milner, in executing his task, has bestowed upon it an
 “ amount of pains and research which goes far beyond anything
 “ which could have been demanded of him. He has made it in
 “ fact a labour of love, and I am persuaded that the result will be
 “ found, not merely useful as a guide, but a trustworthy manual
 “ of botanical biographies.

“ It has had the further advantage of being read in proof by
 “ Mr. Daydon Jackson, the General Secretary of the Linnean
 “ Society, who has kindly undertaken the labour, and whose know-
 “ ledge of the history of botanists is altogether unequalled.

"The collection is shown in Museum No. I. It is as far as possible arranged alphabetically, beginning on the top floor. For the sake of completeness a few other memorials preserved elsewhere are included. In these cases the building is indicated in brackets. Those hung in the Herbarium have a special and intimate relation with the work of that department."

While no effort has been spared to ensure the absence of error it is hardly possible to hope for absolute accuracy or completeness in a work that involves the citation of so many dates. In a few instances, those of Mrs. Aiton, wife of W. Aiton, of A. W. Roth, and of James Thornton, "the King's Gardener at Kew," neither the date of birth nor the date of death is given; in others, those of A. Cruckshanks, of T. Drummond, and of Professor R. Scott, the date of birth is unknown; in a few more cases, those of J. Arnold, L. Fuchs and J. Haverfield, Junr., the date of birth requires confirmation. In the case of Roth the dates appear to be 1757-1834.

Owing to an undetected typographical error the date of Mr. J. G. Baker's first appointment to the Herbarium at Kew is given as 1886 instead of 1866. In the case of Dr. John Sims the dates 1792-1838, taken from Pritzel's *Thesaurus*, ed. 2, p. 298, are incorrect; the true dates are 1749-1831. It has also to be noted that Chabreaus, p. 27, was son-in-law to J. Bauhin; the text inadvertently reverses the connection between these two botanists. The communication of dates to fill the lacunae indicated, and the correction of any errors that may be detected in addition to those now pointed out will be welcomed. It ought to have been noted, on p. 87, that the bust of the late Miss North is to be found in the Gallery, presented by her to the nation, which contains her magnificent collection of botanical paintings.

Additions to the Herbarium during 1901.—Donations of specimens were made by more than one hundred persons and institutions, and amounted to about 12,000 sheets. The specimens purchased amounted to over 6,500. The principal collections are enumerated below.

VARIOUS PARTS OF THE WORLD. *Presented*:—Herbarium of the late Mr. W. Mathews, by Mrs. Mathews; Fungi, by M. A. Jaczewski; Erysiphaceae, by Mr. E. S. Salmon; Hepaticae, by the Rev. C. H. Binstead.

Purchased:—Dr. C. F. Arnold, Lichens.

EUROPE. *Presented*:—Faeroe Islands, by Mr. C. H. Ostenfeld; "Herbarium Florae Rossicae," fasc. xiii.-xviii., by the Botanical Museum, Imperial Academy of Sciences, St. Petersburg; "Flora Exsiccata Austro-hungarica," Cent. xxxiii.-xxxiv., by the University Botanical Museum, Vienna; "Kryptogamae Exsiccatae," Cent. vii., by the Imperial Natural History Museum, Vienna; Bosnia and Bulgaria, by Mr. H. J. Elwes; "Hieraciotheca gallica et hispanica," fasc. x.-xi., by M. G. Gautier; "Hepaticae Galliae," fasc. ix., by M. T. Husnot.

Purchased:—Rabenhorst, "Fungi Europaei," ser. II., Cent. xliii.; Linton, British Hieracia, fasc. vi.; Dahlstedt, Scandinavian

Hieracia, Cent. xii.-xiii.; Kneucker, "Carices Exsiccatae," lief. viii.-x.; "Cyperaceae et Juncaceae Exsiccatae, lief. ii.; "Gramineae Exsiccatae," lief. vi.

NORTH AFRICA. *Presented*:—Egyptian and Algerian Salsolaceae, by Dr. G. Schweinfurth.

NORTH AND CENTRAL ASIA. *Presented*:—Siberia, by Mr. H. W. Arnell; Central Asia, by Imperial Botanic Garden, St. Petersburg; Thian Shan Mountains, by Mr. St. George R. Littledale.

CHINA AND JAPAN. *Presented*:—Henry, Morse and Ducloux, China, by Dr. A. Henry; Hong Kong, by Mr. W. J. Tutchter; Japanese Mosses, by Dr. Kingo Miyabe.

Purchased:—Okamura, "Algae Japonicae Exsiccatae," fasc. i.

INDIA. *Presented*:—N. W. India, by Mr. J. F. Duthie.

MALAYA. *Presented*:—By Botanic Gardens, Singapore; by Botanic Gardens, Buitenzorg.

Purchased:—Andrews, Christmas Island; Zimmermann, Siam.

AUSTRALIA. *Presented*:—Goadby, Western Australia, by Miss Morgan; Western Australia, by Dr. Alexander Morrison.

Purchased:—Pritzel, Western Australia.

TROPICAL AFRICA. *Presented*:—Gold Coast, by Mr. W. H. Johnson; Punch, Lagos, by Sir W. MacGregor, K.C.M.G., C.B.; Nile Land, by Mr. C. E. Muriel; Uganda, by Sir H. H. Johnston, G.C.M.G., K.C.B.; Abyssinia, coll. by the late Captain Wellby, by Mr. J. H. Wellby; Zanzibar, by Mr. R. N. Lyne; Lake Nyassa, by the Ven. Archdeacon W. P. Johnson; do., by Miss E. Kenyon; Purves, Nyasaland, by Mr. J. McClounie.

Purchased:—Zenker, Cameroons; Baum, South West Africa.

SOUTH AFRICA. *Presented*:—Cape Colony, coll. by the late Mrs. Hugh Jameson, by Miss E. M. Piesse; Cape Colony, by Dr. H. H. Bolus; do., by Major Wolley Dod; Transvaal, by Sir J. Kirk, G.C.M.G., K.C.B.; Restiaceae, by the Manchester Museum.

Purchased:—R. Schlechter, S. Africa.

NORTH AMERICA. *Presented*:—Colorado, by the New York Botanic Garden; California, by the Department of Agriculture, Washington; Canadian Carices, by Mr. C. B. Clarke; Yukon and Montana Mosses, by the New York Botanic Garden; Fungi of Florida, by Mr. H. H. Hume; Crataegus, &c., by the Arnold Arboretum.

Purchased:—Cusick, Oregon; H. M. Hall, California; A. Nelson, Wyoming; Earle, New Mexico; Bush, Missouri, Arkansas and Texas; Harper, Georgia; Curtiss, Southern United States, ser. vii.; J. C. Arthur, "Uredineae Exsiccatae et Icones," fasc. iii.; Grout, North American Mosses.

CENTRAL AMERICA. *Presented*:—Mexico, by the United States National Museum; British Honduras, by Mr. E. J. F. Campbell.

Purchased:—Pringle, Mexico ; Townsend and Barber, Mexican coll. of 1899 ; Pittier, Costa Rica.

SOUTH AMERICA. *Presented*:—Brazil, chiefly Bignoniaceae, by the Imperial Botanic Garden, St. Petersburg.

The most important accession was a series of collections from various parts of China, amounting to nearly three thousand specimens, collected by Messrs. Morse, Ducloux and Henry, and presented by the latter. A valuable contribution made by the Imperial Botanic Garden, St. Petersburg, was a set of Riedel's Brazilian Bignoniaceae, determined by Schumann, and quoted by him in Martius, "*Flora Brasiliensis*," vol. VIII., pars II.

Medallion Portrait of Sir Joseph Hooker.—A special gold medal was awarded by the Linnean Society in 1898, at the Anniversary Meeting, to Sir Joseph Dalton Hooker, G.C.S.I., C.B., F.R.S., "in recognition of the services rendered by him to science during '60 years of unremitting labour.'" The obverse of the medal is a bust of Sir Joseph to the left, from life, by Frank Bowcher, with the legend J. D. H. Æt. LXXX. The reverse shows a wreath of Sikkim Rhododendrons surrounding an inscription which records the presentation, designed by John Pinches, by whom the medal was struck.

The artist's original model was three times the size of the medal. Bronze castings of this were made ; one of these was added to the Kew collection of portraits of botanists in 1899 as the gift of the President and Council of the Linnean Society. This copy finds an appropriate place in the general collection of portraits. The presentation of another copy of this medallion portrait has now to be noted. This copy is the gift of the artist, Mr. Bowcher, who has asked that it may find a place in the visitors' room at the Herbarium, where so much of Sir Joseph Hooker's work has been done.

Presentations to the Library during 1901.—Thirty-nine dissertations have been received from Dr. Hans Schinz, who has also presented several books and pamphlets including : *Jaccard, Catalogue de la Flore Valaisanne*, 1895 ; *Leist, Ueber den Einfluss des alpinen Standortes auf die Ausbildung der Laubblätter*, 1889 ; *Lesquereux, Catalogue des Mousses de la Suisse*, 1845 ; *Minks, Symbolae Licheno-mycologicae*, Theil 1, 1881 ; *Winckler, Geschichte der Botanik*, 1854 ; several papers from the *Neue Denkschriften der allgemeinen schweizerischen Gesellschaft*, by Cramer, Naegeli, and others ; and the continuation of the *Mitteilungen aus dem Botanischen Museum der Universität Zürich*. Some of the works included in Dr. Schinz's gift are scarce and consequently not easy to procure. From the Trustees of the British Museum have been received vol. ii., part 2, of the *Catalogue of the African Plants collected by Dr. F. Welwitsch*, which contains the Cryptogams, elaborated by various authors ; also the second part of the *Illustrations of the Botany of Captain Cook's Voyage* ; and *Catalogue*

of the Mesozoic Plants in the Department of Geology, British Museum, part 1, by A. C. Seward. The following works from the library of the late Mr. James Huntingford Morgan, were presented by Miss Morgan : *Blenkarn, British Timber Trees*, 1862 ; *Hooker, Sir W. J., Kew Gardens, or a popular Guide to the Royal Botanic Gardens of Kew*, ed. 17, 1858 ; 3 volumes of McIntosh's Gardening Works, 1838-1839 ; and *Thornton, A Grammar of Botany*, 1811. From Mr. Geo. Nicholson were received : *Hoare, Calendar of Flowering Shrubs and Trees* ; *Maund, The Botanical Souvenir*, which is a selection of coloured figures from *The Botanist* by the same author ; and the *Transactions of the English Arboricultural Society*, vols. i.-iv. Besides the continuation of about 20 serial publications the Bentham Trustees have presented a nice clean copy, in a paper cover, of one of P. Belon's rarer works *De arboribus coniferis*, etc., 1553 ; also *L. Fuchs, Commentaires tres excellens de l'histoire des plantes*, etc., 1549 ; and a fine copy of *The Herefordshire Pomona*, by R. Hogg and H. G. Bull, 1876-85. Fuchs' work is a French edition of *De historia stirpium*, published in Basle in 1542—a work famous for the excellence of the wood-cuts, which are reduced in size in the translation. To Prof. A. H. Church, Kew is indebted for the *Jahresberichte über die Fortschritte . . . der Agrikultur-Chemie*, 1858-99, 42 vols., and *Die landwirthschaftlichen Versuchstationen*, 1868-1900, vols. 10-54, with subsequent volumes of both periodicals as they are published. Other contributions to the library are : *Ruiz Lopez, Memoria sobre las virtudes y usos de la raiz de Purhampuy ó China Peruana*, 1821, and *Triller, Diss. de corticis peruviani usu*, 1758, from Mr. W. Fawcett ; *R. Sernander, Den Skandinaviska Vegetationens Spridningsbiologi*, 1901, from the Librarian, Royal University of Upsala ; *F. M. Bailey, The Queensland Flora*, parts 3 and 4, from the author ; *G. Barchhausen, Specimen botanicum sistens fasc. plantarum ex Flora Comitatus Lippiaci*, 1775, from Mr. B. Daydon Jackson ; *J. Cardot, Mousses, et coup-d'œil sur la flore bryologique des Terres Magellaniques*, 1901, and *Recherches anatomiques sur les Leucobryacées*, 1900, from the author ; *A. de Coincy, Ecloga quinta plantarum hispanicarum*, 1901, from the author ; *Th. Cooke, The Flora of the Presidency of Bombay*, part 1, 1901, from the Secretary of State for India ; *B. C. Cincinato da Costa, O Portugal vinicola*, 1900, a finely illustrated folio work on the Vine, from the Secretary of State for Foreign Affairs ; *E. De Wildeman, Observations sur les Apocynacées à latex*, etc., 1901, from the author. *E. De Wildeman and Th. Durand, Reliquiae Dewevreanae*, i., fasc. 1, 1901, and other publications of the Muséum du Congo, from the Secrétaire Général du Département de l'Intérieur, Brussels ; *L. Diels, Die Flora von Central-China*, 1901, from the author ; *J. Donn, Hortus cantabrigiensis*, ed. 12, 1831, from Mr. Spencer George Perceval ; *E. L. Greene, Plantae Bakerianae*, 3 fascicles, 1901, from the author ; *H. G. Hallier, Ueber die Verwandtschaftsverhältnisse der Tubifloren und Ebenalen*, etc., 1901, and another paper, from the author ; *W. L. Jepson, A Flora of Western Middle California*, 1901, from Mr. J. Burt Davy ; *O. Lignier, Végétaux fossiles de Normandie*, 2 and 3, 1895 and 1901, from the author ; *F. Niedenzu, Diss. de genere Banisteria*, pars 2, 1901, and *De genere Byrsonima*,

pars. 1 [-2], 1897-1901, from the author; *Pliny, Historiae Mundi libri xxxvii.*, 1615, from Miss Catharine Sharpe; *R. Pound and F. E. Clements, The Phytogeography of Nebraska*, 1898, and ed. 2, 1900, from the authors; *Prodromus Florae Batavae*, vol. 1, pars 1, ed. 2, 1901, from the Nederlandsche Botanische Vereeniging; several papers from Mr. J. Barbosa Rodrigues and the late Dr. F. Sadebeck; *Sander's Orchid Guide*, 1901, from Messrs. F. Sander & Sons; *J. Wright, The Fruit Grower's Guide*, 1892, 3 vols., from Messrs. J. S. Virtue & Co.; *Biltmore Botanical Studies*, 1901, from the Director of the Biltmore Herbarium; *Annual Reports of the Cambridge University Department of Agriculture*, 1-3, 1898-1900, from Dr. Wm. Somerville; *Mittheilungen des Thüringischen Botanischen Vereins*, neue Folge, Hefte 1-15, 1891-1900, from the late Prof. C. Haussknecht; *Arboretum Amazonicum*, dec. 1 and 2, 1900, from the Director of the Museu Paraense; *Fauna, Flora and Geology of the Clyde Area*, edited by G. F. Scott Elliot and others, 1901, from the Acting Secretary of the Glasgow Meeting of the British Association. Sir Joseph D. Hooker, G.C.S.I., C.B., has presented the continuations of several periodicals including the *Berichte der Deutschen Botanischen Gesellschaft* and the *Comptes Rendus . . . de l'Académie des Sciences, Paris*.

In addition to the above the library has received numerous pamphlets presented by their respective authors and a number of periodicals sent in exchange.

Hortus Veitchii.—Noteworthy among recent gifts to the library is a copy of the superior edition of a book bearing the above title, compiled by James H. Veitch and distributed by the well-known firm of James Veitch & Sons, of Chelsea. As the title states, it is a history of the rise and progress of their nurseries, together with an account of the botanical collectors and hybridists employed by them, and a list of the most remarkable of their introductions. The paper, typography, and illustrations of this handsome volume of 500 pages are of the best, but it has a greater value as a record of the achievements of a firm foremost in this country for its enterprise and for its support of botany through its travellers in all parts of the world. In addition to their ordinary duties of collecting seeds and living plants, they were instructed to dry specimens, not only of plants of probable commercial value, but also, so far as their time and means of transport permitted, those of purely botanical interest. The list of travellers begins with the well-known name of William Lobb, 1840 to 1857, followed by his brother Thomas, 1843 to 1860, and ends with that of E. H. Wilson, 1899 to 1905. Of the 22 collectors who travelled for the firm during this period, three were members of the family, namely, John Gould Veitch, 1860 to 1870; P. C. M. Veitch, 1875 to 1878; and James H. Veitch, the present Managing Director of the firm, 1891 to 1893. Through the liberality of Messrs. Veitch most of their travellers are represented in the Kew Herbarium, and some largely, notably the Lobbs, J. H. Veitch, and especially Wilson, whose dried collections comprised some 25,000 specimens, a complete set of which was presented to Kew, and it includes a very large number of novelties.

From 1841, when the late Sir William Hooker became Director of Kew, the "Botanical Magazine" has been essentially a Kew publication, but the "Hortus Veitchii" contains a list of 422 plates for which Messrs. Veitch contributed the material, either directly or indirectly, as the original introducers.

In the sketches of the lives of the travellers and hybridists, as well as in the notes on the plants introduced by the firm, there are many facts of the greatest importance and value in the history of botany and gardening, and Messrs. Veitch deserve the thanks of all persons interested in these sciences for the admirable manner in which they have put them on record.

Flora of Tropical Africa.—The issue of another part of this work has to be recorded. This part (vol. iv., sect. 2, part ii.) concludes the elaboration of the Tropical African *Convolvulaceae* (pp. 193–206) by Mr. J. G. Baker and Dr. A. B. Rendle, and also contains the *Solanaceae* (pp. 207–261) by Mr. C. H. Wright, and the first part of the *Scrophulariaceae* (up to *Buchnera*) (pp. 261–384) by Mr. W. B. Hemsley and Mr. S. A. Skan.

The *Convolvulaceae*, the greater part of which was published in the first part of section 2 of volume iv., comprise 286 species in 28 genera. Among them are only 11 new species, all but two described by Dr. Rendle. The small number of novelties finds its explanation in the fact that the order has recently been studied by Dr. Hallier f., of Hamburg, who published a series of articles on it containing numerous descriptions of new species. The largest genus is *Ipomoea*, with 151 species. The definitions and the arrangement of the genera adopted by the authors coincide on the whole with the system proposed by Hallier f. in Engler's Bot. Jahrb. xvi. (1892), pp. 453–591.

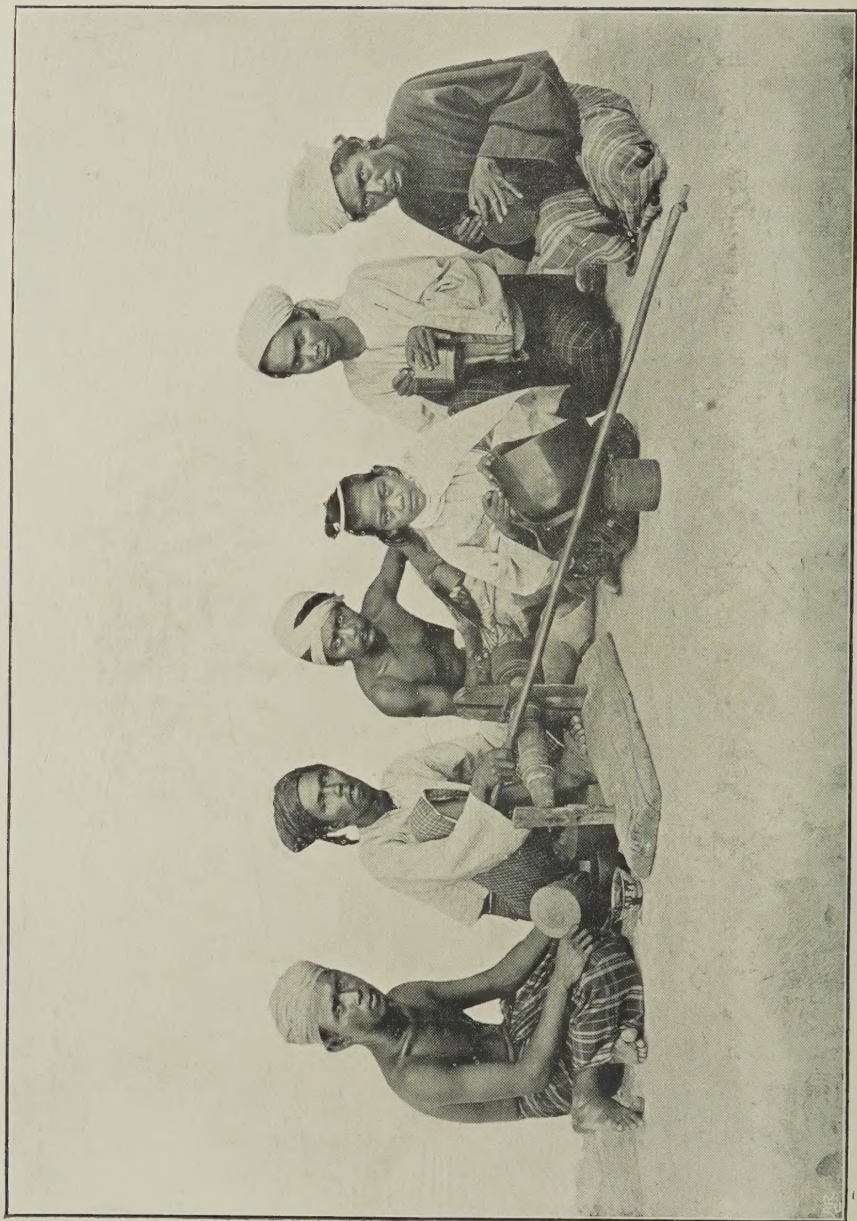
Most of the genera have a wide distribution, extending either to the Indo-Malayan region or to tropical America or all over the tropics. There is, however, a distinct endemic element of generic rank comprising about one-quarter of the genera (with about 40 species) and developed mainly in the dry regions of East Africa.

The *Solanaceae* comprise 11 genera with 131 species, of which over 100 belong to *Solanum*. The only endemic (and monotypic genus) is *Discopodium*, ranging from Abyssinia to Fernando Po and Nyasaland. Five species, all of *Solanum*, have been described here for the first time. Most species of *Solanum* are peculiar to Africa, very few extending to Arabia or beyond it to Baluchistan or Scind; only three have a wide range outside Africa. Although the genus is so abundantly represented in America, there are only two species common to America and tropical Africa, and those two are weeds. Of the other genera, *Capsicum*, *Cestrum*, *Datura*, *Nicotiana* and *Schwenkia* represent a distinctly American element, and some of them have undoubtedly been introduced from America within historical times.

The *Scrophulariaceae* are represented in this part of volume ii. by 40 genera (their total, according to the Clavis, is 54) with 227 species. There are no new genera among them, but 31 new species

are described by Mr. Skan, seven by Mr. Hemsley, and one by Mr. N. E. Brown. *Stemodiopsis* (two species in Nyasaland and one species in Somaliland) and the very singular submerged monotypic *Dintera* from Hereroland are the only endemic tropical African genera of *Scrophulariaceae* recorded in this part. A very strong South African element is represented by the *Aptosimeae*, *Hemimerideae*, and *Manuleae*, whilst a boreal element, much less numerous, enters with the *Antirrhineae*, *Verbascum*, *Scrophularia*, and *Veronica*. The *Gratioleae* (74 species), on the other hand, constitute a palaeotropic component, most of the genera having a wide distribution in the tropical and sub-tropical regions of the Old World. Very singular is the occurrence of the Andine *Hydrantheium egense* in two localities (one in Southern Nigeria, the other in the Congo State).

Flora of the Malayan Peninsula.—Numbers 16, 17, and 18 of Sir George King's "Materials for a Flora of the Malayan Peninsula" were issued at the beginning of the year, bringing the work down to the *Pedaliaceae*. In these, as in the numbers 14 and 15, Mr. J. S. Gamble is associated with Sir George King. No. 16 begins with an account of the genus *Psychotria*, of which twenty-nine species are described, eleven of them being new. It also contains the natural orders *Valerianaceae*, *Compositae*, *Stylidiaceae*, *Goodenoviaceae*, *Campanulaceae*, *Vacciniaceae*, *Ericaceae*, *Epacridaceae*, *Plumbaginaceae*, *Monotropaceae* (by Lieut.-Col. Prain), and *Gentianaceae* (by Mr. C. B. Clarke). These orders include only forty-eight genera and eighty-one species, of which two and seventeen respectively are new. The new genera are: *Pernettiopsis*, King and Gamble (*Ericaceae*), of which there are two shrubby epiphytic species; and *Microrphium*, C. B. Clarke (*Gentianaceae*). The relative poverty in *Compositae* is striking. It is true that twenty-three genera are represented, but eighteen of them by only one species each. Altogether there are only thirty-one species, which are mostly weeds of cultivation; not one is peculiar to the Peninsula. No. 17 contains the *Myrsinaceae*, *Sapotaceae*, *Ebenaceae*, *Styraceae*, and *Oleaceae*, comprising twenty-four genera and 221 species. There are no new genera, but nearly half of the species were previously undescribed. No. 18 contains the natural orders *Hydrophyllaceae* to *Lentibulariaceae*, the *Bignoniaceae* and the *Pedaliaceae*. With the exception of the *Boraginaceae*, by Sir G. King, and the *Hydrophyllaceae* and *Bignoniaceae*, by Mr. Gamble, this part is the work of Lieut.-Col. D. Prain. Fifty-three genera and 150 species are described, none of them for the first time, and comparatively few species of these orders are peculiar to the Peninsula.



GROUP OF PAGAN LACQUER-WARE WORKERS.